

**SUSTAINABILITY PERFORMANCE EVALUATION
MANAGEMENT SYSTEMS MODEL FOR INDIVIDUAL
ORGANIZATIONS AND SUPPLY CHAINS**

by

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A thesis submitted in partial fulfilment of the requirements for the degree of

PhD

CENTRAL QUEENSLAND UNIVERSITY

James Goldstone Faculty of Engineering and Physical Systems

NOVEMBER 2005

CENTRAL QUEENSLAND UNIVERSITY

2005

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ABSTRACT

The title of the research is *Sustainability Performance Evaluation Management Systems Model for Individual Organizations and Supply Chains*. This research has achieved its aim to develop and demonstrate the practical implementation of a simple and objective sustainability performance evaluation management system model for individual organizations and supply chains. It has resulted in the recognition that a new concept – Network of Interested Partners – underpins the achievement of sustainability. The term acknowledges the interdependence and reflects the essential cooperation that must be achieved between business organisations, their commercially related entities and the local community if progress towards sustainability is to be achieved. It therefore encompasses and extends the concept of a supply chain as currently used.

Sustainable Development is defined by the World Commission on Environment and Development as development, which meets the needs of the present without compromising the ability of future societies to meet their own needs. Organizations, as part of human activities, also have to be sustainable. The sustainability of organizations is directly linked to the continual improvement of business performance. Many organizations have found a way to improve performance through the establishment of management systems. International Organization for Standardization (ISO) standards are recognized worldwide as reliable and efficient tools for the implementation of management systems. However, they do not always result in the desired improvement in outcomes. Therefore, if the required improvement of business performance is to be achieved, improved methodologies for development and implementation of performance evaluation (PE) processes are necessary. These methodologies must take into consideration sustainability principles. They also have to be applicable to individual entities and supply chains, with or without management systems in place. Supply chains

are important because it is being increasingly recognized that overall supply chain performance is a means of adding value and competitive advantage to all businesses.

In the first part of the research a performance evaluation model or PE (version 1 model) was developed. This was used as criteria to compare and evaluate existing performance evaluation processes and outcomes of individual organisations and their respective supply chain within the Gladstone region, Australia. Questionnaires have also been used to identify and evaluate the needs of the interested parties in relation to the organizations' and supply chains' business performance and processes of performance evaluation.

All the information provided in the first part of the research was used by the researcher to develop the Sustainability Performance Evaluation Management Systems model or SPEMS (version 2 model). This incorporates the concepts of Network of Interested Parties/Partners. In particular, one of the outcomes is recognition that organizations need to establish partnerships if effective supply chain performance improvement is to be achieved. Therefore the establishment of partnerships has become a key requirement for the implementation of SPEMS.

The establishment of partnership among participants of a supply chain of Gladstone and implementation of the eight first steps of the SPEMS (version 2 model) in this supply chain was commenced successfully through workshops. The supply chain was formed by commercial organizations, government entities and interested parties from the community. SPEMS requires that partners all have the same level of ownership and authority in the decisions of the supply chain.

Some new terms and their definitions have been created within the research to support the new SPEMS model. They include: Network of Interested Partners, sustainability for organizations, sustainability KPI and sustainability friendly organizations.

All of the above are encompassed within the final SPEMS (version 3 model).

**SUSTAINABILITY PERFORMANCE EVALUATION
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PUBLICATIONS AND PARTICIPATION IN EVENTS

1 - Journals and conference proceedings - Refereed

- ❖ Coelho, JFGM & Moy, D 2001, 'Integrated Management Systems and Performance Evaluation - A Case Study in Brazil', paper presented to Annual Quality Conference 2001 - Improving Business, Carlton Crest, Brisbane, Australia, 25-27 November 2001.
- ❖ Coelho, JFGM, Moy, D & Whitwell, R 2002, 'Performance Evaluation: A New Approach for Integrated Management Systems based on the AS/NZS 14031:2000', paper presented to 7th International Conference on ISO 9000 and TQM, RMIT, Melbourne, Australia, 2 - 4 April 2002. - **Awarded best paper in the sub-theme 3 of the Conference.**
- ❖ Coelho, JFGM & Moy, D 2003, 'The New Performance Evaluation Methodology and Its Integration with Management Systems', The TQM Magazine, vol. 15, no. 1, pp. 25-9.
- ❖ Coelho, JFGM, Moy, D & Edwards, R 2004, 'Sustainability Performance Evaluation Management Systems and Corporate Social Responsibility Management Systems', paper presented to Enviro 04 Convention & Exhibition, Sydney Convention Centre, 28 March - 01 April 2004.
- ❖ Coelho, JFGM, Moy, D & Edwards, R 2004, 'Sustainability Performance Evaluation Management Systems (SPEMS) for Network of Interested Partners (NIP)', paper presented to GIN2004 - 12th International Conference of The Greening of Industry Network: Partnerships for Sustainable Development, Hong Kong Convention and Exhibition Centre, 7 - 10 November 2004.

2 – Papers in preparation

- ❖ Coelho, JFGM, Moy, D & Edwards, R 2004, 'Performance Evaluation Management Systems for Organizations and Supply Chains based on the AS/NZS ISO 14031:2000', The Environmental Engineer Journal, vol. Draft (abstract already approved).
- ❖ Coelho, JFGM, Moy, D & Edwards, R 2004, 'The Integration of Corporate Social Responsibility Management Systems and The New Sustainability Performance Evaluation Management Systems', Corporate Governance: The International Journal of Business in Society, vol. Draft (abstract already approved).
- ❖ Coelho, JFGM, Moy, D & Edwards, R 2004, 'Sustainability Performance Evaluation Management Systems (SPEMS) for Supply Chains', Supply Chain Management Journal, vol. Draft.

3 - Symposium proceedings - Non-refereed

- ❖ Coelho, JFGM, Moy, D & Whitwell, R 2001, 'Integrated Management Systems and Performance Evaluation - Case Studies in Brazil', paper presented to 2001 Postgraduate Symposium, Central Queensland University - Rockhampton, October 2001.
- ❖ Coelho, JFGM & Moy, D 2002, 'Performance Evaluation: A New Approach for Integrated Management Systems based on the AS/NZS 14031:2000', paper presented to 2002 Postgraduate Symposium, Central Queensland University - Rockhampton, October 2002. - **Awarded engineering best paper presentation.**
- ❖ Coelho, JFGM, Moy, D & Edwards, R 2003, 'Performance Evaluation Management Systems for Organisations and Supply Chains based on the AS/NZS ISO 14031:2000', paper presented to 2003 Postgraduate Symposium, Central Queensland University - Rockhampton, October 2003.

4 – Platform presentations – Conferences and Symposiums

- ❖ Quality Conference 2001 - Improving Business, Carlton Crest, Brisbane, Australia, 25-27 November 2001.
- ❖ 2001 Postgraduate Symposium, Central Queensland University - Rockhampton, October 2001.
- ❖ 7th International Conference on ISO 9000 and TQM, RMIT, Melbourne, Australia, 2 - 4 April 2002.
- ❖ 2002 Postgraduate Symposium, Central Queensland University - Rockhampton, October 2002.
- ❖ 2003 Postgraduate Symposium, Central Queensland University - Rockhampton, October 2003.
- ❖ Enviro 04 Convention & Exhibition, Sydney Convention Centre, 28 March - 01 April 2004.
- ❖ GIN2004 - 12th International Conference of the Greening of Industry Network: Partnerships for Sustainable Development, Hong Kong Convention and Exhibition Centre, 7 - 10 November 2004.

5 – Seminars presentations and lectures

- ❖ Presentation of poster at Central Queensland University Open Day 2001. The title of the poster was: 'Research Project'.
- ❖ Coelho, JFGM & Moy, D 2003, 'Performance Evaluation Management Systems for Organisations and Supply Chains Based on the AS/NZS 14031:2000', paper presented to Research Seminar of The James Goldston Faculty of Engineering and Physical Systems, Central Queensland University - Gladstone, 16 October 2003.

- ❖ Lectures and presentations to students of The James Goldston Faculty of Engineering and Physical Systems, Central Queensland University related to integrated management systems. The researcher has also provided some materials and advice for the implementation of the integrated management systems of the Faculty.

6 – Nominations and awards

- ❖ Coelho, JFGM 2001, Improvement of Business Performance Towards Sustainability Through Performance Evaluation and Communication - Entrance for the Gladstone Region Business and Management Awards of Excellence 2001 of The Australian Institute of Management, Central Queensland University, Gladstone.
- ❖ Coelho, JFGM 2004, Sustainability Performance Evaluation Management Systems Model for Individual Organizations and Supply Chains - Entrance for the Gladstone 2004 Management and Business Excellence Awards of The Australian Institute of Management, Central Queensland University, Gladstone. - **The Researcher was awarded with ‘Special Commendation’ on the Professional Manager of the Year (2004) category due to the management and strategy used within the PhD research.**

ABBREVIATIONS AND ACRONYMS

AA – Accountability

ABEF - Australian Business Excellence Framework

ANZECC - Australian and New Zealand Environment and Conservation Council State of the Environment Reporting Task Force

AS – Standards Australia

BEST – Biophysical, Environmental, Economic, Societal and Technological Sustainability

BS – British Standards Institute

BSC - Balanced scorecard

CWRT - Centre for Waste Reduction Technologies

CERES - Coalition for Environmentally Responsible Economics

CI – Continual improvement

CO – Commercial organization

COPOLCO - Consumer Policy Committee

CQU – Central Queensland University

CR - Corporate responsibility

CRMS - Corporate responsibility management systems

CRMSSs - Corporate responsibility management system standards

CSA – Canadian Standards Association

CSR - Corporate social responsibility

CSRMS – Corporate social responsibility management systems

DEA - Data envelopment analysis

DJSGI - Dow Jones Sustainability Group Indexes

DJSIF - Dow Jones Sustainability Index Family

DP - Documented procedures

EA – Environmental auditing

ECI - Environmental condition indicators

EIA – Environmental impact assessment

EFQM - European Foundations for Quality Management Excellence Model

EL – Environmental labelling

EMS – Environmental management systems

EMAS - Eco Management and Audit Scheme

EPA – Environmental Protection Agency

EPE – Environmental performance evaluation

EPI - Environmental performance indicators

GAPDL - Gladstone Area Promotion and Development Ltd

GEM - General environmental management

GEMI - Global Environmental Management Initiative

GRI – Global Reporting Initiative

HACCP – Hazard Analysis and Critical Control Point

IMS – Integrated management systems

IO – Individual commercial organization or organization(s)

IP – Interested parties or interested party

ISEA - Institute for Social and Ethical Accountability

ISO - International Organization for Standardization

IT – Information technology

KC – Key characteristics of a business

KPI – Key performance indicator or key performance indicators or performance indicator or performance indicators

LCA - Life cycle assessment

LCSP - Lowell Centre for Sustainable Production

MBNQA - Malcolm Baldrige National Quality Award

MPI - Management performance indicators

MS – Management systems

NIP – Network of interested parties or networks of interested parties

NMED - The State of New Mexico Environment Department

NRTEE – National Round Table on the Environment and the Economy

NSESD – National Strategy for Ecological Sustainable Development

NZS – Standards New Zealand

OPI - Operational performance indicators

PE – Performance evaluation or performance evaluation methodology or performance evaluation model

PEMS - Performance evaluation management systems

PER - Public environmental reporting

PR – Performance reporting

QFD - Quality function deployment

QMS – Quality management systems

QS – Quality system

SA - Social Accountability

SAI - Social Accountability International

SAM - Sustainable Asset Management

SC - Supply chain or supply chains

SCM – Supply chain management

SD – Sustainable development

SI – Standards Israel

SIGMA – Sustainability: Integrated Guidelines for Management Projects

SME – Small and medium enterprise or enterprises

SPEMS – Sustainability performance evaluation management systems or sustainability performance evaluation management system model

SQMS – Safe Quality Management System

TBL – Triple Bottom Line

TC – Technical committee

TQM - Total Quality Management

TR – Technical reporting

UNEP - United Nations Environmental Program

UK – United Kingdom

WBCSD - World Business Council for Sustainable Development

WH&S - Workplace, health and safety

WH&SMS - Workplace, health and safety management systems

WRI - World Resources Institute

WTO - World Trade Organization

GLOSSARY

- ❖ **Aspects** – Causes or elements of the organizations that interact with the social, economic and built/natural environment (term expanded to relate to elements of organizations linked to sustainable principles).
- ❖ **Benchmarking** – The practice of setting operating targets for a particular function by selecting top performance levels.
- ❖ **Communication** – Exchange of information with clear understanding of the subject dealt. Then it is a two way information process that includes the emission of information by a transmitter, the retention and evaluation of the information by the recipient and the feedback of the evaluation of the information received by the recipient to the original transmitter. The information only emitted (one way process) from a transmitter to a recipient is not always clear for the recipient.
- ❖ **Conditions indicators** - Specific expression that provides information about the condition of the environment and of the interested parties (including the society, the employees and the clients).
- ❖ **Consultation** – The action of asking opinion, advice or information from someone.
- ❖ **Continual improvement** - Process to enhance the Management System to achieve improvements in an overall performance in line with the organization's policy.
- ❖ **Cultural performance indicators** - Performance indicators that provide information about the key characteristics of the culture of the community that the organization has influenced. It can also include indicators that provide information about the internal key characteristics of the culture of the organization. The limits used to define those indicators are given by the scope of management systems (e.g. - environmental, WH&S and quality) and the performance criteria.
- ❖ **Culture** - A system of collectively shared values, beliefs, tradition and behavioural norms, unique to a particular group of people (International Labour Office 1996, p.103). It is a body of knowledge that includes ideas and behaviours.
- ❖ **Culture (organizational culture)** - A pattern of assumptions that an organization has invented, discovered or developed in learning to cope with external adaptation and internal integration.
- ❖ **Eco-Efficiency** (it has a similar meaning to Cleaner Production and Sustainable Production) - Business strategy to implement sustainable development. It is the continuous application of an integrated, preventive strategy applied to processes, products and services in pursuit of economic, social, health safety and environmental benefits.
- ❖ **Economic or economic area** – Pertaining to economy where economy is the way that goods and services are produced, distributed and consumed and available resources are correctly and effectively used and managed.

- ❖ **Economic performance indicators** - Performance indicators that provides information about the economic performance of the organization.
- ❖ **Education** - The knowledge that is delivered for a group of people in one recognized area of human knowledge (e.g. Engineering).
- ❖ **Engagement** – The act of compromising someone in an activity or process. In this work there are two types of engagement. The first one is engagement in dialogue between interested parties and organizations (or consultation process) about business activities and the second one is the participation of the interested parties in the strategic plan and decision making process of organizations.
- ❖ **Emergency plan** - Set of procedures, which includes the identification of potential for and response to accidental and emergency situations, and for preventing and mitigating the impacts that may be associated with them.
- ❖ **Environmental area** - Surroundings and their interrelation.
- ❖ **Impact** - Consequence or effect of the activities of entities.
- ❖ **Information** – Emission or reception of knowledge or intelligence.
- ❖ **Integrated management systems** - The organizational structure, planning activities, responsibilities, practices and procedures for developing, implementing, achieving, reviewing and maintaining the organization's policy related to a combined management system that would include environmental management systems, quality management systems occupational health and safety management systems and possibly other management systems implemented in an entity.
- ❖ **Interested parties or stakeholders** - Individual or group concerned with or affected by the performance of an organization.
Notes:
 - In this research, the interested parties have also been organizations. Then when the term, interested parties, is written in the thesis it means that the interested parties have been organizations that represent sectors of the community that have been interested in the activities of the commercial organizations and supply chains.
 - In this research, interested parties directly linked to the activities of organizations are called commercial interested parties and interested parties indirectly linked to the activities of organizations are called non-commercial interested parties.
- ❖ **Key characteristics** - Characteristics of the organization's activities or of its MS that the organization wants to measure to perform an evaluation (e.g. objective/targets, process parameters indicators, aspects/impacts, activities, policy, etc).
- ❖ **Life Cycle Assessment** - Evaluation of inputs, outputs and potential impacts of a product system throughout its life cycle.
- ❖ **Management** - The attainment of organizational goals in an effective and efficient manner through planning, organizing, leading, and controlling organizational resources (Daft 1994, p.8).

- ❖ **Management performance indicators** - Performance indicators that provide information about the management's efforts to influence the organization's performance.
- ❖ **Management program/plan or action plan** - Addressed schedules, resources and responsibilities for achieving the organization's objectives and targets.
- ❖ **Management systems** - The organizational structure, planning activities, responsibilities, practices, procedures for developing, implementing, achieving, reviewing and maintaining the organization policy.
- ❖ **Network** -
 - An interconnected or interrelated chain, group, or system
 - To engage in social or professional 'networking'. Then, 'Networking' is the action of representing in a network a system of interconnected events, processes, etc., esp. in the planning of complex projects or sequences of operations.
- ❖ **Network of Interested Partners** - Close cooperation or partnership among interested parties where there are specified objectives, rights and responsibilities and the partners exchange resources and divide rewards and failures. Partnership needs ownership by all participants of the network. (NOTE: In this thesis the term supply chain was substituted by Network of Interested Partners because supply chain has different meanings among practitioners and academic professionals around the world).
- ❖ **Objective** - Overall goal, arising from the management system policy, that an organization sets itself to achieve.
- ❖ **Operational controls** - Set of plans in order to ensure that the organization's activities are carried out under specific conditions by establishing documented procedures to cover situations where their absence could lead to deviations from the policy and the objectives and targets.
- ❖ **Operational or technical performance indicators** - Performance indicators that provides information about the performance of the organization's operations.
- ❖ **Ownership** -
 - The state, relation, or fact of being an owner.
 - The fact or state of being an owner.
- ❖ **Partner** -
 - One who shares or one associated with another, especially in an action.
 - One who is associated in any function, act, or course of action; one who takes part with another or others in doing something; an associate, colleague or one who has a share or part with another or others; one who is associated with another or others in the enjoyment or possession of anything.
- ❖ **Partnership** -
 - The state of being a partner.
 - The fact or condition of being a partner; association or participation or an association of two or more persons for the carrying on of a business, of which they share the expenses, profit, and loss.

- ❖ **PDCA cycle** – The four-step process of plan, do, check, act cycle of Deming.
- ❖ **Performance** - Results of the organization's management of its activities.
- ❖ **Performance criteria** - Objective, target or other intended level of performance set by the management of the organization and used for the purpose of performance evaluation.
- ❖ **Performance evaluation or performance evaluation methodology** - Process to facilitate management decisions regarding an organization's performance by selecting indicators, collecting and analysing data, reporting and communicating, and periodically reviewing and improving process. Note that in this thesis performance evaluation for organizations also encompasses processes as consultation of interested parties and feedback to interested parties of the consultation process (both processes also called engagement of interested parties), identification of aspects and impacts of business, development of strategic plans and third part verification of some information provided to interested parties.
- ❖ **Performance indicators or KPI** - Specific expression that provides information about organization's performance or condensed information for decision-making.
- ❖ **Procedures or documented procedures** - Documented set of actions in order to ensure that the organization's activities are carried out under specific conditions.
- ❖ **Quality or quality area** - A product or service with quality is the one that assists perfectly, in a reliable way, in an accessible way, in a safe way and at the right time to the customer's needs. (Campos, VF /1992).
- ❖ **Risk** - A measure of the probability and severity (consequence) of an adverse effect (impact) on health, property or the environment. It is often estimated by the mathematical expectation of the consequences of an adverse event occurring.
- ❖ **Risk management** - Systematic method used to identify and evaluate risks associated with any activities, function or process in a way that will enable organizations to minimize losses, to maximize opportunities and to improve the organizational management system.
- ❖ **Social or social area** - Interaction of the individual and the group, or the welfare of human beings as members of society.
- ❖ **Social performance indicators** - Performance indicators that provide information about the key characteristics of the social situation of the community influenced by the organization's activities. The limits used to define those indicators are given by the scope of the Integrated Management Systems (environment, WH&S and quality). In this methodology the Social Performance Indicators will be defined only to show the performance of some key characteristics that were influenced by the environment, the WH&S and the quality areas.
- ❖ **Stakeholders** - Interested parties for the purpose of this work.

- ❖ **Summary indicator** - Performance indicator (PI) that encompasses or represents many other Performance Indicators. It could be considered a summarisation of a larger range of PI.
- ❖ **Supply chain** - A network of facilities and distribution options that performs the functions of procurement of materials; transformation of these materials into intermediate and finished products; and distribution of these finished products to customers. Note that there are many different definitions for supply chain.
- ❖ **Sustainability or Sustainable Development** - Development, which meets the needs of the present without compromising the ability of future generations to meet their own needs. The three constituent parts of sustainability are social, economic and environmental.
- ❖ **Sustainability for organizations** – Attainment of objectives taking into consideration the needs of the interested parties.
- ❖ **Sustainability friendly organization** – A company that drives its activities so as to actively include taking into consideration the needs of the interested parties.
- ❖ **Sustainability indicators or KPI for organizations** – Indicators from each of the areas of sustainability - namely social, economic and environmental – that are considered to address the priority issues identified by the ‘primary’ interested parties linked to the organization/network of interested partners. Primary is taken to refer to: those interested parties who have direct links with the partners or who are directly affected by, or have impact on, the activities of any or all of the partners.
- ❖ **Systems** – A prescribed way of carrying out an activity or sets of activities.
- ❖ **Target** - Detailed performance requirement, quantified where practicable, applicable to the organization or parts thereof, that arises from the objectives and that needs to be set and met in order to achieve those objectives.
- ❖ **Training** - Specific piece of knowledge that is deliver for a group of people.
- ❖ **Workplace, Health and Safety** - Conditions and factors that affect the well-being of employees, temporary workers, contractor personnel, visitors and any other person in the workplace.

ACKNOWLEDGEMENTS

My PhD was the hardest individual trip of my life but at the same time contributed greatly to my knowledge and experience. During its development I have changed my partner, my job, some of my friends, my mind and my soul. I have gained knowledge, life experience and friends, lost hair and nights of sleep but have become wiser and healthier. I have also added to my Brazilian citizenship, the Australian one. Summarizing, I have changed my entire life during the last four years. Uau!!!!

During this journey I have to acknowledge the support of Magnesita SA, INDUSENG, Institute of Sustainable Regional Development, Central Queensland University, Minas Gas, Klabin and Fundação Pio Pena. I have also to acknowledge the attention and support of the professionals linked to those institutions.

My personal thanks to my supervisors, David Moy and Rod Edwards for their significant personal and academic contributions to my life. I thank them for the patience they have had with my limitations.

Additional thanks to Elizabeth Taylor, Peter Wolfs, Richard Whitwell, Pam Brown, Fr. Seamus McMahon, Mrs. Cathy Mikkelsen David Weedon, Phyllida Coombes, David Evans, Jan Dark, Greg Baker and other professionals who added knowledge and provided different type of resources and support to the research and me.

My special thanks to the following entities that have provided information for my research and related professionals, in particular Peter Budd from BSL - Boyne Smelters Ltd (BSL); NRG Gladstone Operating Services Pty Ltd; Queensland Alumina Ltd (QAL); Cleanaway; Collex; Monadelphous Group Ltd – Gladstone Branch; Smorgon Steel

Recycling – Central Queensland Unit; Capral Aluminium Ltd.; Toll Holdings Ltd – Toll North; Gladstone City Council (GCC); Gladstone Entertainment Centre (GEC); Centre Of Social Science Research (CSSR); The Institute for Sustainable Regional Development (ISRD); Department of Families of the State of Queensland; Anglicare; Calliope Landcare; The State Development and Innovation of the State of Queensland; Community Advisory Service of the Gladstone City Council; Environmental Protection Agency (EPA) of the State of Queensland – Sustainable Industries Division and Central Region Branch; Queensland Parliament; Aboriginal Community; Nghulin; Comalco; Gladstone Observer; Port Curtis Waterwatch; Boyne Island Environmental Education Centre (BIEEC); The State Development and Innovation of the State of Queensland; and, Central Queensland University (CQU).

I dedicate this work to myself due to my effort to overcome all the problems that I have had during this PhD journey; my father and mother, Rubens M. Coelho (also his actual wife Laise) and Mercês Guerra who could not see me for four years; Ernesto and Letícia M. Coelho who have decided to continue to be my brother and sister even if I have been absent in their lives for a long time; my life star and lovely niece Gabriela Coelho; my nephew and other nieces whom I do not know personally; and my friends who maybe will not recognize me when they see me again. I also dedicate this work to my two life's sons, Hugo and João.

And God bless everyone included in this acknowledgement.

Note - If I have forgotten to include your name here, do not worry because you are part of my experience and life and I will never forget you. Sorry if I have been so tired that my mind has missed so many important supporters and friends like you.

STATEMENT OF ORIGINAL AUTHORSHIP

I certify that the main text of the thesis and any material contained in this thesis which has been used before is my own and original work.

José Flávio Guerra Machado Coelho