



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

A CONCEPTUAL FRAMEWORK FOR INFORMATION MANAGEMENT

by

JOHANNES JOSEPHUS VAN LOGGERENBERG

Submitted in partial fulfillment of the requirements for the degree

DCom (Informatics)

in the

Department of Informatics

Faculty of Economic and Management Sciences

University of Pretoria

Promoter: Prof J D Roode

1995



UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Crescat Scientia, Vita Excolatur

(Let knowledge grow and life be enriched)



TABLE OF CONTENTS

1. PURPOSE, RESEARCH PHILOSOPHY AND STRUCTURE

1.1	Introduction	2
1.2	Purpose of research	2
1.2.1	Background	2
1.2.2	Problem definition	4
1.2.3	Objectives of the study and research questions	7
1.2.4	Contribution of the study	10
1.3	Research philosophy and approach	10
1.3.1	Introduction	10
1.3.2	Information Management: Natural science or social science?	11
1.3.3	Social research	12
1.3.3.1	A taxonomic framework	13
1.3.4	The research approach followed	18
1.4	Structure of the thesis	20
1.5	Conclusion	21

2. THE NATURE OF INFORMATION

2.1	Introduction	25
2.2	Data, information, knowledge and wisdom	25
2.2.1	Data	25
2.2.2	Information	27
2.2.2.1	Current definitions	27
2.2.2.2	Information and Meaning	35
2.2.2.3	Information defined	37
2.2.3	Knowledge	40
2.2.4	Wisdom	46
2.2.5	The relationship between data, information knowledge and wisdom	47

2.3	The Origin and Relevance of Information	50
2.4	The Life-Cycle of Information	53
2.5	The Dimensions of Information	56
2.5.1	The Resource Dimension	56
2.5.2	The Process Dimension	57
2.5.3	Other dimensions	58
2.6	Characteristics of Information	59
2.7	The Purpose of Information	61
2.8	The Uses of Information	62
2.9	Disciplines related to Information	63
2.9.1	Information Theory	63
2.9.2	Information Science	64
2.9.3	Computer Science	65
2.9.4	Information Systems	66
2.9.5	Information Technology	68
2.9.6	Conclusion	70
2.10	The Cost of Information	70
2.11	The Value of Information	71
2.11.1	The normative value of information	72
2.11.2	The realistic value of information	73
2.11.3	The subjective value of information	74
2.12	The Information Quantity	76
2.13	Information Quality	78
2.14	Summary and Conclusions	82

3. INFORMATION IN CONTEXT

3.1	Introduction	88
3.2	Information and being human	89
3.2.1	Fundamental human needs	89
3.2.2	Information and being	91
3.2.3	Information and communication	93
3.2.4	Information and learning	95

3.3	Information and society	98
3.3.1	The information society	98
3.3.2	An information culture	106
3.3.3	Information and development	109
3.3.4	Ethical issues regarding information	114
3.3.4.1	Ownership	115
3.3.4.2	Privacy and secrecy	118
3.3.4.3	Accuracy	121
3.3.4.4	Access	122
3.3.4.5	Conclusion	123
3.4	Information and the economy	124
3.4.1	The information economy	124
3.4.2	The economics of information	130
3.5	Information and business	132
3.5.1	Historic Perspective	132
3.5.2	Information replacing capital	137
3.5.3	Information and human capital	139
3.5.4	Information and power	141
3.5.5	Information and decision-making	144
3.5.6	Information and innovation	148
3.5.7	Information and organisational politics	149
3.6	Information in national context	151
3.6.1	Information and forms of Government	151
3.6.2	National information policies	154
3.6.3	An Information Bill of Rights	159
3.7	Information in global context	163
3.8	Summary and Conclusions	165

4. THE MANAGEMENT OF INFORMATION

4.1	Introduction	173
4.2	Defining management	173



4.3	Defining information management and information resources management	174
4.3.1	Information resources management (IRM)	174
4.3.2	Information management	179
4.3.3	Information management defined	183
4.3.4	The management of information	184
4.4	The evolution of information management	186
4.5	Characteristics of information management	191
4.5.1	The dimensions of information management	191
4.5.2	Objectives of information management	192
4.5.3	The benefits of information management	194
4.5.4	Principles of information management	198
4.6	Implementing information management	206
4.7	Factors constraining information management in organisations	211
4.8	The consequences of the mismanagement of information	220
4.9	The practice of information management	221
4.10	A model for information management	223
4.11	Conclusion	230

5. THE MANAGEMENT PROCESS APPLIED TO INFORMATION

5.1	Introduction	237
5.2	The management process	237
5.2.1	Planning	239
5.2.1.1	Introduction	239
5.2.1.2	Planning applied to information management	240
5.2.1.3	Planning applied to the management of information	242
5.2.1.4	Planning applied to the individual, business, national and international levels	243
5.2.1.5	Conclusion	244
5.2.2	Organising	244
5.2.2.1	Introduction	244

5.2.2.2	Organising applied to information management	245
5.2.2.3	The Information Manager	251
5.2.2.4	Organising applied to the management of information	253
5.2.2.5	Organising applied to the individual, business, national and international levels	253
5.2.2.6	Conclusion	254
5.2.3	Leading	255
5.2.3.1	Leading applied to information management	256
5.2.4	Controlling	257
5.2.4.1	Introduction	257
5.2.4.2	Control applied to the information management model	259
5.2.4.3	Information accounting	260
5.2.4.4	Information budgeting	262
5.2.4.5	Information auditing	262
5.2.4.6	Controlling applied to the management of information	265
5.2.4.7	Controlling applied on the individual, business, national and international levels	265
5.3	Management functions	266
5.3.1	Production management	267
5.3.2	Marketing management	269
5.3.3	Human Resources and Financial management	271
5.3.4	Management of the information infrastructure	273
5.4	Conclusion	273

6. CONCLUSIONS, IMPLICATIONS AND SUGGESTIONS

6.1	Introduction	278
6.2	Research objectives and research questions revisited	278
6.2.1	Objective 1: Is information a resource?	279



6.2.1.2	Where does information manifest itself in a narrow context?	280
6.2.1.3	Where does information manifest itself in a broader context?	281
6.2.1.4	Is information a resource?	282
6.2.2	Objective 2: Can information be managed?	283
6.2.2.1	What is information management?	283
6.2.2.3	Can the management principles be applied to information?	286
6.2.2.4	Can information be managed?	287
6.2.3	Conclusion	287
6.3	Implications	287
6.3.1	Implications for the individual	287
6.3.2	Implications for business	290
6.3.3	Implications on a national level	292
6.3.4	Implications on an international level	293
6.3.5	Implications for the management of information	293
6.3.6	Implications for information management	294
6.4	Further research work	295
6.5	Contribution	297

REFERENCES

ACKNOWLEDGEMENTS

Nay, be a Columbus to whole new continents and worlds within you, opening new channels, not of trade, but of thought. Every man is the lord of a realm beside which the earthly empire of the Czar is but a petty state, a hummock left by the ice" - Henry David Thoreau (1817-1862)

Doing this study was similar to being at a new and beautiful place for the first time. There is a new discovery, a new surprise, around each corner and down each alley. One stands in wonder and experiences with all the senses. But while one pauses in admiration, other life goes on and, life being what it is, one cannot be at two places at the same time, nor can one do two things at the same time. It calls for a compromise; sacrificing one thing to gain another.

I would like to mention the following people who contributed in some way or another to make this study possible:

- My sincere thanks goes to my wife, Marietjie, and children, Annerie and Eben, who had to endure my absence and absentmindedness for long hours over many years. In particular, I want to thank Marietjie for gently forcing me back to the books when I was procrastinating or when I became discouraged. Her efforts were at the time perhaps not always appreciated, but are certainly now.
- Professor Albert Viljoen suggested the topic to me. This introduced a whole new and enriching dimension into my life and I want to thank him for that.
- Professor Dewald Roode played a significant role. Apart from the role of being my promoter, he was a friend and an inspiration. His ever-present sense of humour added fun to the journey.
- I owe much to my mother and late father. They made my early education possible and encouraged me to improve on it without ever putting pressure on me.

The interest shown and encouragement expressed by my father-in-law is also highly appreciated.

- Many colleagues and friends assisted me in formulating my thoughts and acting as sounding boards. In this respect I would like to thank, *inter alia*, professor Henk de Bruin, dr. Thinus Boshoff, professor Jan Lombard and dr. Johan van Zyl for their valuable contributions.
- During the course of the study, two of my employers, the Development Bank of Southern Africa and Nissan (South Africa) Pty. Ltd. provided me with appropriate computer equipment at home to prepare the document. Their contribution is appreciated. It is hoped that this study will contribute to improved information management at their institutions.

Above all, I owe everything to the Lord, Jesus Christ, who, mercifully, gave me this opportunity and provided me with the strength and abilities to complete it. To Him be all the glory.



EXPLANATORY NOTES

The following notes are provided to explain some of the conventions used in this study:

1. The use of "he" and "his" does not denote gender, but infers "anyone".
2. Quotations are enclosed in quotation marks.
3. Words in square brackets enclosed in quotations have been inserted by the author to improve readability, or applicability of the quote.

ABSTRACT

A CONCEPTUAL FRAMEWORK FOR INFORMATION MANAGEMENT

CANDIDATE: J.J. van Loggerenberg
PROMOTER: Prof. dr. J.D. Roode
DEPARTMENT: Informatics
DEGREE: D Com (Informatics)

Popular writers and experts say that we are living in an "Information" era, that we have become an "Information" society with an "Information" economy. Businesses have come to realise the importance of information for the survival of the enterprise in a business world which is becoming increasingly complex. This realisation led to the concept of "managing information as a resource".

This concept has the underlying assumptions that we know what information and information resources are, that information is indeed a resource and that information can indeed be managed. The purpose of this study is to evaluate these assumptions and to propose a framework for information management.

Information is strongly linked to data, knowledge and wisdom. These terms are often used interchangeably in ordinary language. For the purposes of this study more accurate definitions were proposed. Data are unevaluated attributes, information is data put into perspective and context while knowledge is justified, true beliefs. Wisdom is a special ability of a person to make meaningful "connections" between his own knowledge and information thereby exhibiting insight into a given situation.

Information can only exist in the human mind as that is the only place where meaning can be added. Information can be made tangible by putting it on paper or through verbal expression, but, once outside the mind, it can, at most, be called information resources. The process of transforming data into information resources and transforming information resources into information and knowledge is called the information process. This process is reversible and iterative.

Every single human being needs information in order to survive. It is a basic human need. It plays an important role in learning and in communication with an equally important role in society. It has strong implications regarding the individual's rights to privacy and access to information. The use of information by society has an influence on culture and it shapes a new economy which is based on services and knowledge. It has the ability to replace capital and becomes "capital" in itself. Because of its importance to individuals, business, on a national and international basis, information needs to be managed.

Information management means the cost-effective management of the information process, the information resources and the information infrastructure in pursuit of predetermined goals. It is a centralised function within the organisation with the purpose of facilitating and providing the framework needed within which to manage information. The management of information means that the information resources allocated to individuals are managed prudently and is the responsibility of each individual. The management of information takes place within the framework provided by the information management function.

Information *is* a resource and a manageable one. Considering that a change in a person's knowledge occurs when presented with information, another dimension becomes evident, namely, that of a process; the process of informing. Both these dimensions need an infrastructure in support. Information management is the management of the resource dimension, the process dimension and of the infrastructure and calls for an holistic management approach. The aim of information management is to mobilise the data, information and knowledge resources into productive action. That is the challenge facing individuals, organisations and governments.

SAMEVATTING

'n KONSEPTUELE RAAMWERK VIR INLIGTINGSBESTUUR

KANDIDAAT: J.J. van Loggerenberg
PROMOTOR: Prof. dr. J.D. Roode
DEPARTEMENT: Informatika
GRAAD: D Com (Informatika)

Populêre skrywers en deskundiges beweer dat ons in 'n "inligtings"-era leef en dat ons 'n "inligtings"-samelewing geword het wat op 'n "inligtings"-ekonomie gebaseer is. Ondernemings het lankal reeds die waarde van inligting vir hul oorlewing besef in 'n sakewêreld wat toenemend kompleks geword het. Hierdie besef het gelei tot die konsep: "Die bestuur van inligting as 'n hulpbron".

Hierdie konsep berus op die aannames dat ons weet wat inligting is, dat ons weet wat inligtingshulpbronne is, dat inligting weliswaar 'n hulpbron is en dat dit inderdaad bestuur kán word. Die doel van hierdie studie is om die aannames te toets en om 'n raamwerk vir inligtingsbestuur voor te stel.

Die begrip "inligting" staan in noue verband tot die begrippe data, kennis en wysheid. In die gewone omgangstaal word hierdie begrippe dikwels as sinonieme gebruik. Vir die doeleindes van hierdie studie moes meer akkurate definisies gevind word. Data is ongeëvalueerde eienskappe, inligting is data wat in perspektief en binne konteks geplaas is en kennis is geregverdigde, ware oortuigings. Wysheid is a spesiale eienskap wat iemand besit om betekenisvolle "verbindings" te maak tussen die kennis en inligting wat hy reeds besit om sodoende besondere insig in 'n gegewe situasie te toon.

Inligting kan slegs in die menslike brein bestaan aangesien betekenis slegs daar toegevoeg kan word. Inligting kan wel tasbaar gemaak word deur dit op papier te plaas of deur verbale uitdrukking, maar sodra dit buite die brein is, kan dit hoogstens as inligtingshulpbronne beskryf word. Die proses waardeur data tot inligtingshulpbronne en inligtingshulpbronne tot

inligting en kennis omvorm word, word die inligtingsproses genoem. Hierdie proses is omkeerbaar en iteratief.

Elke enkele mens het inligting nodig om te lewe. Dit is 'n basiese menslike behoefte. Dit speel 'n belangrike rol in die leerproses en in kommunikasie en is derhalwe belangrik in die samelewing. Dit het sterk implikasies vir die individu se reg tot privaatheid en sy reg van toegang tot inligtingshulpbronne. Die gebruik van inligting deur die samelewing het 'n invloed op kultuur en skep 'n ekonomie wat op dienste en kennis gebaseer is. Dit het die eienskap dat dit kapitaal kan "verplaas" en dat dit "kapitaal" op sigself kan word. As gevolg van die belangrikheid vir individue, sakeondernemings en regerings, moet inligting bestuur word.

Inligtingsbestuur beteken die koste-effektiewe bestuur van die inligtingsproses, die inligtingshulpbronne en die inligtingsinfrastruktuur ter bereiking van voorafbepaalde doelwitte. Dit is 'n gesentraliseerde funksie binne die onderneming met die doel om te fasiliteer en die raamwerk daar te stel waarbinne inligting bestuur moet word. Die bestuur van inligting, daarenteen, beteken dat die inligtingshulpbronne wat aan individue binne die onderneming toegedeel is, met omsigtigheid en verantwoordelikheid bestuur moet word. Laasgenoemde is die verantwoordelikheid van elke individu. Die bestuur van inligting vind plaas binne die raamwerk wat deur inligtingsbestuur verskaf word.

Inligting *is* 'n hulpbron en dit *is* bestuurbaar. As daar in ag geneem word dat 'n verandering in 'n persoon se kennis plaasvind wanneer hy met inligting gekonfronteer word, word 'n ander dimensie duidelik, naamlik, dié van 'n proses; die proses van "om ingelig te word". Beide hierdie dimensies benodig 'n infrastruktuur ter ondersteuning. Inligtingsbestuur is die bestuur van die hulpbrondimensie, die prosesdimensie en van die infrastruktuur en verg 'n holistiese bestuursbenadering. Die doel van inligtingsbestuur is om die data, inligtings- en kennishulpbronne te mobiliseer tot produktiewe aksie. Dit is die uitdaging aan individue, ondernemings en regerings.