

Department	Management Systems	
Discipline	Business ICTs	
Research Focus Area	Formalisms for Business ICTs	
Supervision Team	Prof JA (André) van der Poll	
Name: Prof JA (André) van der Poll Email: vdpolja@unisa.ac.za	Academic Profile: Professor André van der Poll joined the then Department of Computer Science and Information Systems at Unisa in 1988. He holds a Doctorate in Computer Science and his areas of specialisation are the formal specification of software systems, reasoning about specifications, and evaluating formal and semi-formal specification notations. He joined the Unisa SBL in July 2013 as a Professor in ICT Management and his research interests are in the specification and reasoning of ICT management processes and the formalisation of business process models. He is an NRF rated researcher and is involved in a project to investigate the impact of computing formalisms in mission-critical software applications.	Capacity 5 DBL students
Research Agenda	<p>It is the opinion of the supervisor of this project that the maturity of a subject is determined by the level of formalism of its components and processes. Formalism in this context denotes the use of mathematical notation. For example, in determining the value proposition of (e.g.) a process, one has to measure such value, either qualitatively by conducting a natural-language argument or by resorting to quantitative notations (numbers, symbols, etc.). Clearly, the use of numbers will give you a more accurate value-added metric.</p> <p>Some researchers, however, disagree with having to formalise subject matter. They claim that some things simply cannot and should not be formalised (see Le Charlier et al. – [3] below).</p> <p>In addition, the role of upper managers in promoting or preventing any development project is critical. Hence, this research will concentrate on these aspects.</p> <p>Keeping the above debate and upper-manager roles in mind, the research done under the guidance of the supervisor will be in business ICTS with emphasis on specifying, reasoning about and evaluating different (and often opposing) business models, frameworks, descriptions and notations. New frameworks or models could be proposed through the research, followed by an evaluation of such proposals and facilitation of these by upper-managers.</p>	
Reading: Subject Field	<p>[1] Spivey, J.M. (1989) An Introduction to Z and Formal Specifications, <i>Software Engineering Journal</i>, 4(1), pp. 40 – 50, DOI: 10.1049/sej.1989.0006</p> <p>[2] Swatman, P.A., Fowler, D. and Gan, C.Y.M (1992) <i>Extending the Useful Application Domain for Formal Methods</i>, Z User Workshop, York, Workshops in Computing , pp. 125-144, Springer, London, DOI: 10.1007/978-1-4471-3203-5_6.</p>	

	<p>[3] Le Charlier, B. and Flener, P. (1998) Specifications are necessarily informal or: Some more myths of formal methods. <i>Journal of Systems and Software</i>, (40), pp. 275 – 296.</p> <p>[4] Stidolph, D.C. and Whitehead, J. (2003) <i>Managerial Issues for the Consideration and Use of Formal Methods</i>. In In Stefania Gnesi, Keijiro Araki, and Dino Mandrioli (eds.), International Symposium of Formal Methods Europe (FME), pp. 8 – 14.</p> <p>[5] Bowen, J.P. and Hinchey, M.G. (2006) Ten commandments of formal methods . . . ten years later, <i>Computer</i>, 39(1), pp. 40 – 48, ISSN: 0018-9162, DOI: 10.1109/MC.2006.35</p> <p>[6] Van der Poll, J.A. (2010) Formal Methods in Software Development: A Road Less Travelled. <i>South African Computer Journal (SACJ)</i>, No. 45, pp. 40 – 52.</p> <p>[7] Tebele, M.W. (2015) Knowledge Management Systems in Railway Industry, <i>MBLREPP Dissertation</i>, Unisa SBL.</p>
<p>Reading: Research Methodology</p>	<p>There are many good scholarly readings on research methodology; the following represent a good sample (some books may have later editions available):</p> <p>[1] Olivier, M.S. (2009) <i>Information Technology Research: A Practical Guide for Computer Science and Informatics</i>, Van Schaik.</p> <p>[2] Creswell, J.W. 2009. <i>Research design: Qualitative, quantitative and mixed methods approaches</i>. Los Angeles: Sage.</p> <p>[3] Henning, E. 2005. <i>Finding your way in qualitative research</i>. 2nd edition. Pretoria: Van Schaik Publishers.</p> <p>[4] Hofstee, E. 2006. <i>Constructing a good dissertation: A practical guide to finishing a master's, MBA or PhD on schedule</i>. South Africa: EPE Publishers.</p> <p>[5] Yin, R.K. (2013) <i>Case Study Research – Design and Methods</i>, 5th edition, New York, Sage Publications.</p> <p>[6] Saunders, M., Lewis P. and Thornhill, A. (2009) <i>Research Methods for Business Students</i>, 5th edition, Financial Times/Prentice Hall.</p> <p>[7] Oates B. J. (2006) <i>Researching Information Systems and Computing</i>, Sage Publications Ltd, London.</p>
<p>Resources:</p>	<p>Communities:</p> <p>[1] Regular <i>Conference on Business Process Management</i>. Proceedings published as a volume in the Lecture Notes in Computer Science (LNCS)</p> <p>[2] Annual workshop on: <i>Modelling, Specification, Validation and Verification on Enterprise Information Systems (MSVVEIS)</i></p> <p>[3] Annual conference of the <i>South African Institute of Computer Scientists and Information Technologists (SAICSIT)</i></p> <p>Various web sites and discussion forums can be obtained from the supervisor. Good groups to register on are “Dbworld” or “SEWorld” – obtained through (e.g.) a Google search.</p>
<p>Potential DBL Research Focus Areas or Research Projects</p> <p>The following research projects or topics are possibilities for a DBL in this focus area:</p>	

- [1] The status of Formal Methods (FMs) in the *business world* with reference to *specification* and subsequent *reasoning* about the specification. The contribution of this research may be a comprehensive framework to assist managers in adopting the FM methodology.
- [2] Same as the above, but the emphasis will be on *technology management*, specifically *ICT management* and/or *governance* (*governance in this sense is linked to another Business ICT focus area*). Existing frameworks and models may be researched and compared for their utility. The study could put forward a comprehensive set of recommendations, or build a new framework, etc.
- [3] Evaluating and Reasoning about *Business Process Models* (BPM). Many such models exist and a similar research methodology to [2] above could be followed.
- [4] All of the above may be done but with formalisms in Cloud Computing, Business Intelligence, Business Process modelling, etc.

Unit of Analysis	Research Focus
Managers – CIOs, CEOs	<ul style="list-style-type: none"> • Facilitating the use of FMs for business
Software for business	<ul style="list-style-type: none"> • The business use of this particular software development methodology.