# The development of an internal technology strategy assessment framework within the services sector utilising total quality management (TQM) principles

by

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**Abstract:**

**The development of an internal technology strategy assessment framework within the services sector utilising total quality management (TQM) principles**

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Technology is accepted as one of the key aspects that influence society and business in an unmistakable manner. Current literature is however not singular in its views and methods of technology strategy, its interface with business strategy, and how technology strategy is executed and assessed internally.

The text adopts a 3-tiered domain approach at the outset, focussing on the integration of (i) strategy, (ii) measurement and (iii) architecture. The literature assessment was carried out on the hand of the three domains and ultimately resulted in the proposed internal technology strategy assessment framework for the services sector. At the heart of the framework is the merging of the disciplines and current models of (i) technology management (MOT), (ii) business architecture, (iii) strategic performance measurement and (iv) total quality management. The model aims to indicate that specific modelling techniques coupled with an excellence scorecard, can facilitate the mathematical assessment of strategic contribution of individual technology artefacts to a specific business strategy.

The proposed model is represented in the text in flowchart form and is supplemented by the derivation of the required research approach, namely case study protocol. Three case studies were conducted, each of which is resident in the services sector, and the tabulated results are presented in the text and its appendixes.

The results obtained indicate that strategic artefact differentiation on a procedural level can indeed be obtained. These results are consistent throughout the three case studies and valuable future benefit could be extrapolated for (i) continuing investigation on the hand of the model, as well as (ii) cross-pollination to the disciplines of (a) enterprise modelling and design and (b) project management.

**Samevatting:**

**The development of an internal technology strategy assessment framework within the services sector utilising total quality management (TQM) principles**

deur

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*Sleutelwoorde* - Strategie, tegnologiestrategie, tegnologiebestuur, argitektuur, argitektuur-raamwerke, totale kwaliteitsbestuur, totale kwaliteitsbestuur-raamwerke, uitnemendheidsmodelle, strategiese prestasiemeeting

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Tegnologie word algemeen aanvaar as een van die mees deurslaggewende drywers wat besigheid en die samelewing onomkeerbaar verander. Hedendaagse literatuur is egter nie eensgesind in sy opinie en metodes van tegnologiestrategie, die raakvlak wat dit maak met besigheidstrategie, en hoe tegnologiestrategie uitgevoer en geassesseer word nie.

Aan die hand van ‘n drie-ledige benadering, fokus die teks gevolglik op die integrasie van (i) strategie, (ii) meting / assessering, en (iii) argitektuur. Die literatuurstudie was uitgevoer in lyn met die eersgenoemde benadering en het uiteidelik gemanifesteer in die voorstelling van ‘n interne tegnologiestrategie assesseringsmodel, spesifiek gefokus op die dienste sektor. Die kern van hierdie model is die vereniging van die dissiplines en modelle van (i) tegnologiebestuur, (ii) besigheidsargitektuur, (iii) strategiese prestasiemeeting en (iv) totale kwaliteitsbestuur. Die model poog om te wys dat spesifieke modelleringstegnieke gekoppel met ‘n uitnemendheids-gebasseerde telkaart die wiskundige assessering van individuele tegnologiese artefakte se strategiese bydrae kan fasiliteer. Die model word in die teks voorgestel deur middel van ‘n vloeidiagram en die nodige data vir die model was ingesamel deur gebruik te maak van gevallestudie protokol. Drie gevallestudies was uitgevoer, elk in die dienste sektor, en die getabuleerde resultate is gelys in die teks en die aanhangsels.

Die studieresultate dui daarop dat strategiese tegnologie artefak differensiëring inderdaad op ‘n proses vlak kan plaasvind. Hierdie uitkoms was konsekwent waargeneem regdeur al drie die gevallestudies en tot gevolg kon waardevolle gevolgtrekkings en antisipasies ge-ekstrapoleer word. Hierdie ekstrapolasies is voordelig tot (i) die voortsetting van navorsing in die model op sig self, maar ook (ii) toekomstige voordeel vir die dissiplines van (a) industriële integrasie en –modellering en (b) projekbestuur.

**Note:**

**An unusual vast amount of data is attached in the appendixes to the text. This is contrary to academic protocol and customary practice. However in this instance this is done purposefully with the express goal to (i) support the text, (ii) enhance the proposed model and research design, and (iii) illustrate the practical enactment and implications of the research model. This has however been limited to Case Study Candidate #1's results only.**

**Acknowledgements**

**This dissertation is dedicated to Bert Engelbrecht:**
**A mentor and a great businessman.**

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# ***LIST OF ABBREVIATIONS AND ACRONYMS***

| | | |
|---|---|---|
| AMICE | - | European Computer Integrated Manufacturing Architecture |
| ARIS | - | Architecture of Integrated Information Systems |
| BEE | - | Black economic empowerment |
| BPR | - | Business process re-engineering |
| CASE | - | Computer aided software engineering |
| CEO | - | Chief executive officer |
| CIM | - | Computer Integrated Manufacturing |
| CIMOSA | - | Computer Integrated Manufacturing Open Systems Architecture |
| CIO | - | Chief information officer |
| CSF | - | Critical success factor |
| CTO | - | Chief technology officer |
| EFQM | - | European foundation for quality management |
| EU | - | European Union |
| HR | - | Human resources |
| IFAC | - | International Federation of Automatic Control |
| IFIP | - | International Federation for Information Processing |
| IS | - | Information system(s) |
| ISA | - | Information Systems Architecture |
| IT | - | Information technology |
| JIT | - | Just in time |
| MIS | - | Management information system(s) |
| MOT | - | Management of technology |
| NRC | - | National research council |
| OID | - | Object interface diagram |
| PENST | - | Political, economical, natural, social and technological |
| PERA | - | Perdue Enterprise Reference Architecture |
| POS | - | Point of sale |
| R&D | - | Research and development |
| ROA | - | Return on assets |
| ROI | - | Return on investment |
| ROIC | - | Return on invested capital |
| ROS | - | Return on sales |

| | | |
|---|---|---|
| SAEF | - | South African excellence foundation |
| STA | - | Strategic technology areas |
| SWOT | - | Strength, weakness, opportunity, threat |
| TQM | - | Total quality management |
| UK | - | United Kingdom |
| US | - | United States of America |
| USA | - | United States of America |
| WIP | - | Work-in-progress |

***Let no man say that I have said nothing new,***
***the arrangement of the material is new.***

***Just as the same words differently arranged***
***form different thoughts.***

***- Blaise Pascal***