ATT: CEO / MD / CFO / EXCO / Engineering Manager / Information Manager / Continuous Improver

RE: THE VALUE OF **"BENCHMARKING"** YOUR INDUSTRIAL SYSTEMS & PROCESSES USING **"RECP"**

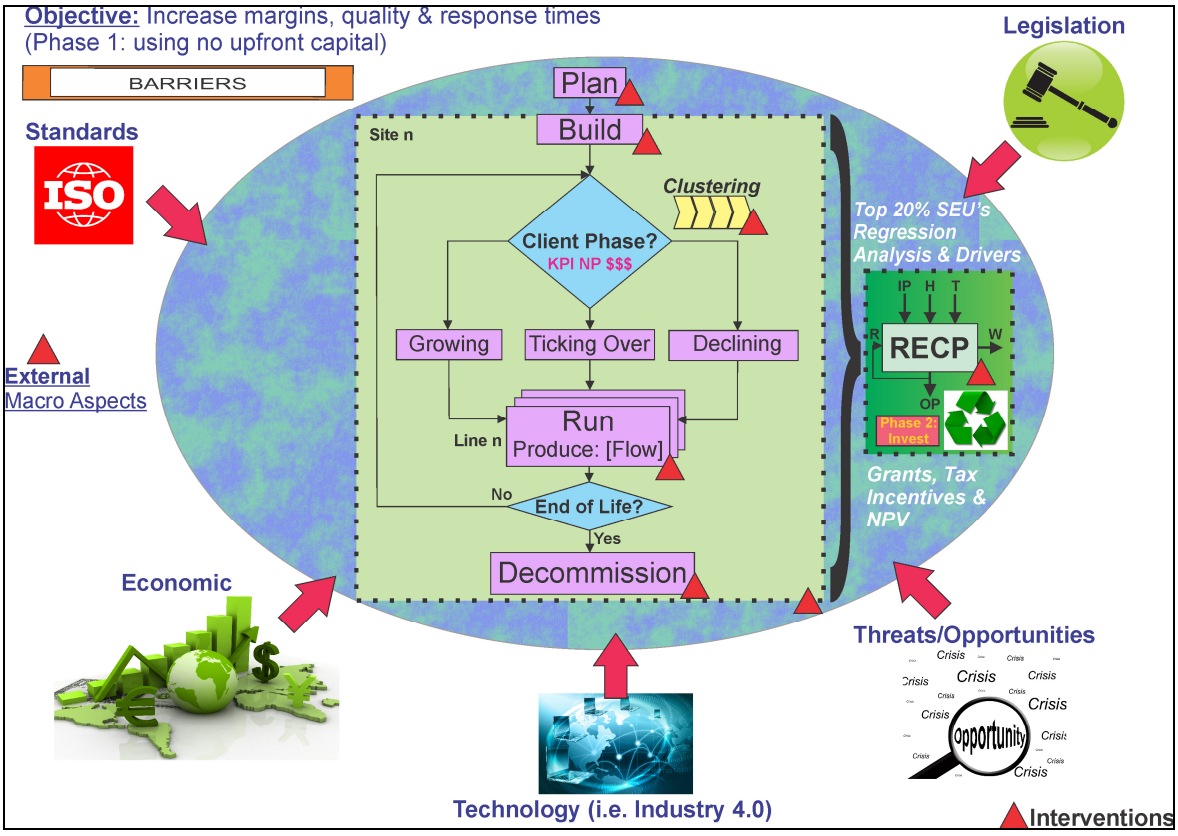
Preamble

Architects Integrating Industry (**Ai2SA**) hope to illustrate to you why it is beneficial to consider "independent **benchmarking**" of your Industrial Systems and Processes along with some of our other value add services based on the "Resource Efficiency Cleaner Production" (**RECP**) principles introduced by the Department of Trade and Industry (**DTI**) initiative, the National Cleaner Production Centre of South Africa (**NCPC-SA**) hosted at **CSIR** premises in Tshwane. RECP subsequently considers optimal use of resources (raw materials, energy and water) along with the reduction of waste and while not always the case RECP assessments leads to a review of the Energy (*all forms*) Management System (**EnMS**) and subsequent implementation of some form of Energy Systems Optimization (**ESO**) and we are of the opinion that industrial systems plays a **vital role** in this. **Envisaged savings are found to be +/- 10 to 25%, (payback < 2yr).** See www.NCPC.co.za for some independent case studies. *For us to be able to predict your savings we would need to follow the methodology, obtain relevant information and perform the required **NPV** calculations to determine payback period, etc.*

Benchmarking (the process **industry leaders** use to compare key parameters of its business to that of its peers) traditionally does not extend to include the "**maturity**" of industrial Control & Instrumentation (**C&I**) along with supervisory system(s) known as Programmable Logic Controllers (**PLC's**) and Supervisory, Control and Data Acquisition (**SCADA**), deemed non-discretionary nor Management Information or other value add Systems (i.e. **MIS**, etc.) considered to be "optional". Traditionally often suppliers merely attempted to "move boxes" and didn't always consider client's "cycles" (i.e. growing / declining) or phases (i.e. building / operating) clients finds itself in however given global downturn every supplier has to ask itself how it can add value to its clients by **either driving costs down or profits up**, hence are forced to review supplier's value proposition(s).

Introducing the RECP model and "Benchmarking" in the context of "Industrial Systems"

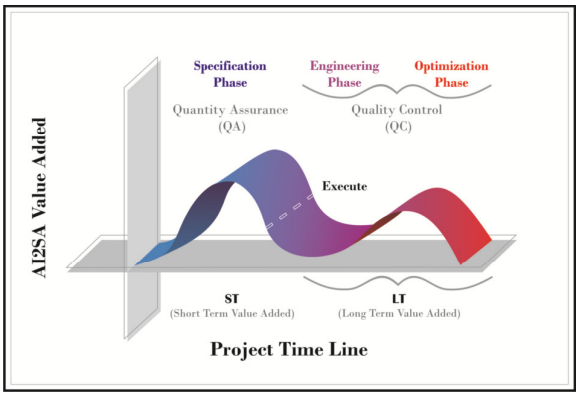
The figure below introduces "the world" according to our client's view to which we as supplier's / service providers sometimes are oblivious.



Looking at figure it should be evident that the objective is to **increase client's margins, quality and response times** and that initially some of the interventions (as depicted with red triangles) should be possible to be implemented without (significant) upfront capital following "RECP" savings realized…We realize various "barriers" exist in that clients are busy and may not have the capacity to implement solutions so hope projected savings will assist in motivating some of the considerations / recommendations listed within.

External (macro) variables such as legal, economic, and technological aspects, etc. has a direct impact on a client's sustainability and hence the 1st intervention to be considered is for client's to perform ongoing proactive research into these and in terms of technology it is either up to client's internal resources often overloaded with operational tasks or that of a 3rd party (preferably vendor independent to be objective). Doing so will lead to the client identifying both possible risks along with opportunities allowing for more proactive strategies to be developed to mitigate risks brought on by outdated equipment and maximize / capitalize on for instance technological advances / trends i.e. Internet of Things (IoT), the fourth industrial revolution, etc.

Based on the aforementioned external variables clients enter the "plan phase" associated to a typical facility lifecycle which is also the point at which most value may be created by performing accurate feasibility studies, etc. (See enclosed adjacent figure). Should it be found viable the client would proceed to "build phase" to setup new operations (sites) or additional machine(s) / production processes / facility, lines, etc. Significant savings may be realized using "mass production tools" to for instance reduce time and associated costs to produce designs / software and hence it is advisable for client to have up to date standards and specifications in place. It is also advisable to manage this phase properly to ensure in scope, time and cost delivery to specified standards and that project actually meets its preset objectives.



During "production (run) phase" various additional "value add" technologies / principles may be considered to further enhance production to assist in achieving the listed objectives (increase profits). Some of these are listed in the questionnaire below and you are encouraged to rate your maturity in line with it. Note clients may either be growing / declining or just "ticking over" in terms of "net profit". Overall across the life cycle of the facility other interventions may also be considered to add value to the organization i.e. "change control", etc.

It is hence imperative that clients consider the RECP principles across the total lifecycle of the facility. RECP considers interventions in following six (6) areas in order to achieve its objectives namely: 1.) "housekeeping" (i.e. training operational personal in various aspects, establishing procedures, etc.), 2.) Substitute / reduce "inputs" (i.e. Energy by performing **regression analysis** to determine top significant energy users (SEU) vs. key drivers, raw materials, EnPI's, etc.), 3.) internal re-use / recovery of "by products" produced, 4.) modification of outputs (i.e. that which is produced), 5.) make use of the industrial symbioses program (IPS) sending waste to others that may use it and only then finally 6.) introduce new technology (i.e. processes / equipment) so only at this stage does value add technologies (which may require capital) get considered. Prior to this objective is to try and identify ways to leverage RECP principles ideally without 1st spending capital upfront and then only once savings are realized to apply the savings to effect more changes. **Grants, tax incentives, funding** and other models do exist and more information can be made available re this. Also feel free to refer to AI2SA Green Economy Value proposition for some more information on how automation and information systems may contribute to savings along with our references having performed such projects.

Clients are urged to consider "clustering" (based on value chains / knowledge areas, etc.) as introduced within respective frame works such as the National Developmental Plan (NDP), Industrial Policy Action Plan (IPAP) along with others and possible spin offs being created by these formal plans and to align / rally behind them. The aforementioned requires for businesses to work closer together across the complete value chain in order to leverage critical mass and economies of scale which has the added benefit of promoting 'localization" which in Tshwane we have taking it further in terms of attempting to attract and retain business to the region. At present the 1st major hurdle however is to overcome (via lobbying) the political barriers which are deemed to exist in that there are no formal policies that specify incentives (i.e. tax rebates, etc.) or penalties for promoting

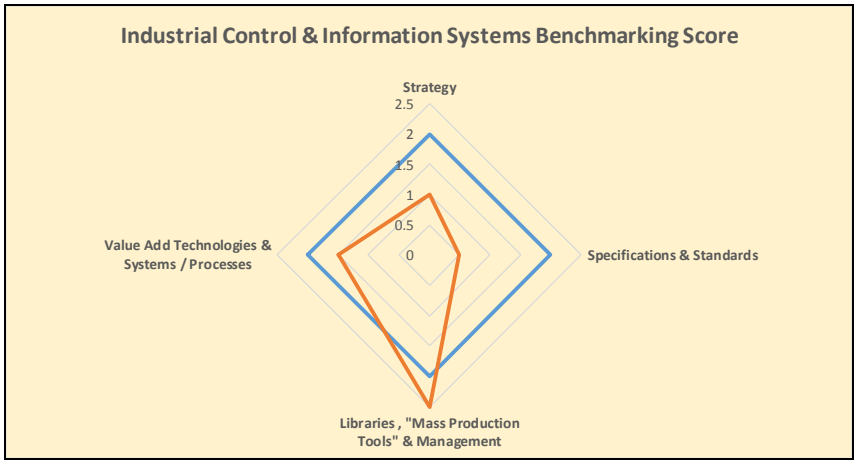
compliance with this objective. The aforementioned also implies being up to date with planned interventions in order to capitalize on these. Hence it is for this reason that Ai2SA has opted to join the local business chamber (www.CCBC.co.za) and have taken on the role of non-executive director for the Manufacturing, Mining and Infrastructure Portfolio within Tshwane.

In line with "benchmarking" we have developed the questionnaire below which we hope to maintain and hope it assists clients with rating themselves in terms of how they fair against their peers (once we have put questionnaire "on line".) A more legible copy can be requested from author. Please feel free to contribute.

#	Dimension(s) & Question(s)	Score	Consideration(s)	Client Comments
A	**Strategy**	2	**Relates to longer term planning (+/- 3 years+)**	
1	Does your organization have a "formal plan / roadmap document" based on the on-going / formal review of external (macro) environment (trends), specifically "Industrial Technology Systems" whether compiled by "internal" competent resources / "external" independent specialist consultants? If so please elaborate.	2	If the answer is "1" it is advisable to obtain an objective opinion on the current state of equipment installed to attempt to identify potential risks and to determine if there are lost opportunities not being exploited.	
2	Have you considered other / all RECP initiatives? If so please elaborate.	2	Typically your organization has an proactive approach to continuous improvement also in relation to automation systems	
3	Do you form part of any "cluster" concepts of models? If so please elaborate.	2	This question aims to identify if you are implementing any of the NDP / IPAP, etc. policy framework actions	
B	**Specifications & Standards**	2	**Relates to specification of projects (prior to implementation)**	
1	Does your organization make use of an official scope of works / supply document detailing exact requirements when obtaining pricing or do you prefer suppliers to interpret? If so please elaborate.	2	If you make use of suppliers to advise, while moving risk & bid cost to them to specify you ultimately remain responsible to review respective offers from a technical point of view to ensure no omissions and to ensure same base line is used for pricing. Suppliers would always quote on what is best to them in terms of re-use and not necessarily pass on savings to client unless forced to do so in terms of competition.	
2	Does your organization's terms and conditions cover technical aspects? If so please elaborate.	2	Most clauses do not relate to functional objects only to tangible items i.e. equipment as apposed to services / quality, etc.	
3	Does your organization have formal specifications? If so please elaborate.	2	Most companies do not have equipment or other specifications detailing standards used which makes repeat procurement time consuming as redesigns are required to specify equipment needed.	
C	**Libraries , "Mass Production Tools" & Management**	2	**Relates to construction phase of projects**	
1	Does your organization have formal software libraries issued to system integrators to bid on using these are baseline? If so please elaborate.	2	A fair amount of repeatability exist within respective processes and project costs may be reduced should libraries be used. This benefit is not passed on by default to clients	
2	Does your organization have a "projects" department and if so do they make use of any "mass production" engineering tools in relation to control and instrumentation systems? If so please elaborate.	2	A fair amount of repeatability exist within respective processes and project costs may be reduced should "mass production" "engineering tools" be used. This benefit is not passed on by default to clients	
3	Does your organization pro actively manage both the day to day and week to week aspects of a project including quality control in order to mitigate risk associated to scope & budget creep, etc.? If so please elaborate.	2	Most organizations do not have internal capacity to manage the complexity and amount of line items associated to a typical control system project so while system integrator may perform this function their perspective is to protect their interest and not necessarily that of client which may be a mutually exclusive affair	
4	Does your organization make use of change management systems / processes to track changes within software or documents, etc.? If so please elaborate.	2	Most organizations does not make use of such systems as technology has been maturing and some of features are imbedded into some of the tools.	
D	**Value Add Technologies & Systems / Processes**	2	**Relates to "run" phase of the operations**	
1	Does your organization makes use of service level agreement (SLA) / 3rd party service providers to compliment the internal resources (should you have any) in response to breakdowns & small changes. If so please elaborate.	2	While most clients make use of internal resources the level of expertise depends on roles awarded to technical staff and not all organizations to projects in house resulting in a gap in capacity.	
2	Does your organization make use of an integrated / automated management information system (MIS) or do you still make use of paper based system(s) to record production / down time, etc. ? If so please elaborate.	2	There is a drive to implement "systems" between control and business layers closing the gap however some suppliers are trying to solve this from "bottom up" while others attempt a "top down" approach indicating that this domain is still maturing.	
3	Does your organization make use of other value add products such as down time monitoring tools (SMS / Emails, etc.), overall equipment efficiency (OEE) monitoring, integrated / automated maintenance systems, condition based monitoring (CBM), alarm suppression (EMEU), etc. If so please elaborate.	2	This typically is dependant on type of process and while suppliers normally try and sell "value add" in this space it should ideally be initiated following RECP principles. More systems may be listed.	

The score achieved upon completion of questionnaire is depicted below in both table and graphical form. As indicated the peer review figures will only become more meaningful once more clients give input into survey. We have indicated some estimated savings based on similar projects undertaken. The respective value propositions detail how we calculate savings in more detail as we do not wish to make this document too long.

#	Dimension(s)	Envisaged Savings	Score	Peers
A	Strategy	+- 15%	2	1
B	Specifications & Standards	+- 20%	2	0.5
C	Libraries , "Mass Production Tools" & Management	+- 25%	2	2.5
D	Value Add Technologies & Systems / Processes	+- 20%	2	1.5
Note: Peer scores to follow in on line survey				



Finally, some project references listing high level details of similar bench marking studies are depicted below:

#	Industry(s)/Sector(s)/Type(s)	Category	Region	I/O Count
1	Cement Manufacturing	Manufacturing	KZN	20000
2	Iron Works	Manufacturing	Free State	200000
3	Household Goods Manufacturing and Packaging	Manufacturing	Gauteng	3000
4	Steel Manufacturer	Smelting	Pakistan	800
5	Refinery	Refining	Gauteng	7000
6	Refinery	Refining	Gauteng	7000
7	Nuclear	Nuclear	North West	500
8	System Integrator	Various	Gauteng	NA
9	System Integrator	Various	Mpumalanga	NA
10	System Integrator	Various	Gauteng	NA
11	Chrome Mining, Smelting and Pelletising & Sintering	Mining & Smelting	Gauteng	2000
12	Platinum Mine	Mining & Smelting	North West	1000
13	Zinc Mine	Mining & Smelting	India	1500
14	Manganese Mine	Mining & Smelting	Northern Cape	1500
15	Drinking Water Treatment Plant	Water	Free State	2000
16	Coal Mine	Mining & Smelting	Mpumalanga	3500
17	Chrome Processing Plant	Mining & Smelting	North West	6000
18	Chrome Processing Plant	Mining & Smelting	North West	1000
19	Glass Manufacturing Plant	Glass	Gauteng	3500
20	Iron Mine	Mining & Smelting	Gauteng	20000
21	Bakery	Food and Beverage	Gauteng	500
22	Car Manufacturing	Automotive	Gauteng	2000
23	Power Utility	Energy-electricity	Mpumalanga	8000

Please feel free to contact the author should you require any more clarity re enclosed or require such a “bench marking” exercise to be undertaken in order for us to quantify actual savings we believe may be realized. Note while our services may be offered free of charge we may request that you assist in contributing to payments of our overheads such as travel and accommodation at market related fees. To be negotiated upfront.

Thank you kindly and kind regards, **Petrus Klopper,** Managing Director

Please note: Ai2SA is in the process of registering officially as RECP / EnMS & ESO practitioners with respective authorities.