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A Murphological View on Software Measurement: a serious joke or a funny serious thing?

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Abstract

The 30-year experience from the Software Measurement field explains that a strong resistance usually comes from project team members, supposing the real objective is a personal evaluation on their performance and not a neutral measurement for a concrete process improvement. Concurrently, from the middle '80s a series of SPI models - such as the Software Capability Maturity Model (Sw-CMM) and nowadays its evolution, the CMMI – provided a guide for realising a real improvement, where measurement played an important role, before as a Common Feature, then as a separate process (MA – Measurement and Analysis) at Level 2. But a certain resistance still remain alive also after these years.

Recently, in the Management field (and also in ICT) more than "serious" books and reference guides it seems that (apparent) semi-serious publications such as the Dilbert strips by Scott Adams are referenced in technical presentations and papers as a starting point for commenting daily ICT malpractices. If so, another good source for "joking" with such serious things are some of the most know laws, the "Murphy's laws", originally written by Arthur Block and after created/modified by plenty of people worldwide and published over the Internet in a sort of "GNU licence for humour".

This paper tries to propose a "murphological view" on Software Measurement issues, commenting some related measurement-related laws and providing links with main SPI practices at the aim to reduce the percentage of failures in application of Software Measurement programs, as noted by H.Rubin some years ago.

1. Introduction

In a well-known paper written quite 10 years ago, Howard Rubin proposed a list of 10 most critical failures for software measurement programs [1], stating that only in a ratio of 1:5 or 1:6 software companies were successful in this implementation after a 2-years timeframe. During last years there were more studies focusing on the most relevant internal [17] and external [16] measurement program success factors. After 10 years, some resistance have been won, measurement has been recognized more and more in the Software Engineering arena: also in most used SPI models it passed from a simple activity to be a fundamental process in SPI models such as CMMI [2] and SPICE [3], GQM [4] is now a recognized and sound acronym more than a decade ago. But despite all, some resistances still remain alive into technical people, probably inner fears that measurement is and will be about people and not processes.

Thus the question is: how to look at removing this misconception and resistance towards measurement in ICT companies? Paradoxically, its greater recognition in SPI models and literature risks to move companies towards lower (and not higher) maturity levels, being now a process and not anymore an activity or a common feature…Is there a different way to speak to technical people convincing them that measurement means control on their activities, possibly helping them in improving their performances (using the old motto by T.Demarco that "*you cannot measure what you cannot control*"?).

In a recent "Backtalk" column [5], some well know proverbs have been interpreted from a measurement perspective, in order to propose some common-sense concepts, but in a different context.

Again, one of the most sold management books of the '90s – that's not officially a management textbook – is the "*Dilbert Principle*" by Scott Adams [6], referenced in hundreds of technical publications and presentation as a starting point for commenting daily ICT bugs and malpractices[22].

But the "father of all management humour" probably is given by "*Murphy's* laws", originally collected and proposed by Arthur Block from the end of '70s [7][8], that generated a sort of "*GNU licence for humour*" during years, because hundreds of new original laws, theorems, corollaries and principles have been created and made available on the Net, also some specific to Engineering and more specific to Software Engineering.

So, our aim would be to have a "murphological view" on Software Measurement, in order to derive useful tips for SPI with this schema, in a sort of IDEAL [9] path:

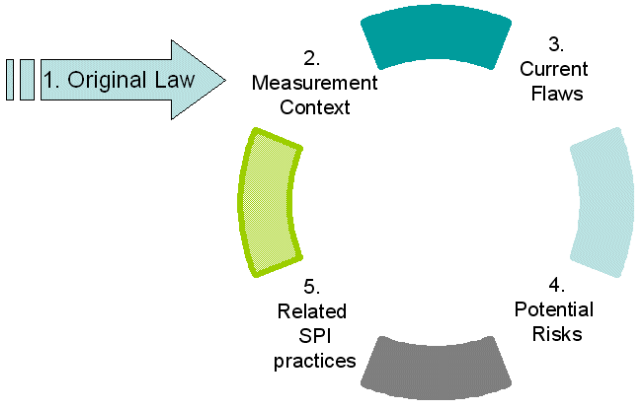

Figure 1: A different view on Root-Cause Analysis (RCA) for Software Process Improvement

The question to pose and answer is: how can these tips be used and add value within the organisation? There is long debate about which CMM maturity level should a software company ISO 9001 certified should be rated and several sources in the literature consider a middle way between Level 2 and 3 [14][15], even if it is not possible a direct comparability because they express a different granularity (ISO 9001:2000 is a list of requirements to be accomplished, while CMMI is a process model yet proposing a solution to those (partly) requirements). Anyway, a relevant and fundamental issue from the ISO viewpoint is the capability for a certified company to run Root-Cause Analysis (RCA) for solving problems under the *continuous improvement* principle, that's also the main objective for the Causal Analysis & Resolution (CAR) CMMI Process Area (at ML5).

Another underline principle of Process Improvement is to learn from experiences and to store the more experience as possible in some knowledge databases. As shown in Fig.1, steps #3 and #4 represent a sort of pre-RCA that a company can use when that effect (described in general terms in step #2) will appear. In fact, CAR introductory notes reports that "[…] *Since defects and problems may have been previously encountered on other projects or in earlier phases or tasks of the current project, causal analysis and resolution activities are a mechanism for communicating lessons learned among projects*". In particular, CAR SP1.2-1 (*Analyse Causes*) in the sub-practice #4 proposes to use different sources for writing action proposals. And a knowledge base, as proposed as an elaboration of CAR GP2.3 (*Provide Resources*), including such pre-analysis yet linked to CMMI (or another SPI model as People-CMM [23]) practices could be a valuable source to use and improve during time.

[22] See also the Dilbert daily strips on http://www.dilbert.com

This paper is organized as follows: Section 2 proposes a list of selected laws with a fit with the measurement context. Section 3 proposed their comment according to the above schema. Finally, Section 4 proposes some conclusions and prospects about a possible semi-serious (or semi-joking, according viewpoints) usage of these laws for a software measurement dissemination action in ICT companies.

2. Laws

2.1. Selected Laws

Main sources are – with no doubt – the books first two books from Arthur Block [7] [8]. After, we started to search over the Net for other new, original laws treating or being referable to Software Measurement. There is a plenty of web pages: from this huge list, we selected four ones [10][11][12][13], from which 21 laws were extracted, presented in next section.

2.2. Commented Laws

In this case it could be used for deriving a table like this one:

L## [Source]	***Law:*** ***Text of the Law***
Measurement context	*A contextualisation of the above law to the Software Measurement field*
Current flaw(s)	*A list of possible current flaws detected in your company about this law*
Potential risk(s)	*A list of potential risks associated to those flaws, if actual (1st part of What-If analysis)*
Missing opportunity(ies)	° *A list of missing opportunities to take, if a solution will be applied (2nd part of What-If analysis)*
Related SPI reference(s)	° *A list of CMMI v1.1 references about that law as a pointer for Process Improvement actions*

Here in the following there is a selected (but absolutely not exhaustive) list of 21 laws in the "Murphy" (A.Block) style, each commented in a separate table.

L01 [12]	**Murphy's Law:** **If anything can go wrong, it will**
Measurement context	A testing traceability matrix can help in evaluating how much functionality (and at which level of granularity) have been considered in the Test Plan.
Current flaw(s)	Few test cases defined in the Test Plan at the different levels (Unit, Integration, System, …). Possible negative results
Potential risk(s)	Possible untested requirements or features, in particular at the Integration or System Testing level, delaying the UAT (User Acceptance Test) milestone or – if discovered after it – producing a certain amount of defect reports within the warranty period.
Missing opportunity(ies)	° Improving the overall quality of the solution provided and the project ROI
Related SPI reference(s)	CMMI ° VER SP1.1-1 (Select Work Products for Verification)

L02 [10]	**Allen's Axiom:** **When all else fails, read the directions**
Measurement context	In the analysis of a Control Chart is relevant to observe the number of data points between the centreline and the Upper Control Level (UCL)/ Lower Control Level (LCL), in order to determine is a certain event can be classified as special or common cause.
Current flaw(s)	Organisations rated at a ML lower than ML4 not always have in place Statistical Process Control (SPC) tools for monitoring their projects and processes. In particular, often experience databases do not contain a huge number of instances, useful for determining the trend for a certain phenomenon.
Potential risk(s)	A wrong action could be taken if the analysed cause is improperly classified
Missing opportunity(ies)	° Improve the skills of technical people with Statistics and TQM issues ° Having a better background in linking causes and effects
Related SPI reference(s)	CMMI ° QPM SP2.2-1 #4 (Apply Statistical Methods to Understand Variations) ° CAR SP2.2-1 (Evaluate the Effect of Changes) ° OPP GP2.5 (Train People)

L03[10]	**Arnold's Law of Documentation:** **1. If it should exist, it doesn't.** **2. If it does exist, it's out of date.** 3. **Only documentation for useless programs transcends the first two laws**
Measurement context	There are several (base and derived) measures used for properly monitor and control the project, typically described in a Measurement Plan, and derived using a goal-oriented approach (e.g. GQM). They can be seen from a twofold perspective: definitions and results, both referable to measures and measurement process.
Current flaw(s)	Documenting the project is often perceived by project team members as a waste of time, because a support and not a primary process.
Potential risk(s)	A not shared definition of measures (as well as the measurement process) can lead to interpretations of such measures and to the gathering of different and inconsistent quantities for a certain event, making useless any report and statistics.
Missing opportunity(ies)	° To keep advantage from measurement for your projects/activities
Related SPI reference(s)	CMMI ° MEA (all the PA)

L04[10]	**Bolub's Fourth Law of Computerdom:** **Project teams detest weekly progress reporting because it so vividly manifests their lack of progress**
Measurement context	Evaluate the progress of your project using some PM well-known figures (e.g. EVMS)
Current flaw(s)	Even if is a ML2 practice, many project teams tend to consider the week as a too short period for tracking progresses, underestimating achieved project's results. They apply often some progress rules of thumb proposed by PMBOK, as the 50/50 or the 80/20 rules.
Potential risk(s)	Corrective or improvement actions could be taken too late in order to respect the project budget, because the larger delay between two progress meetings
Missing opportunity(ies)	° Some stakeholders could have no news on facts impacting also on the activities they are managing or are involved with
Related SPI reference(s)	CMMI ° PMC SP1.6-1 (Conduct Progress Review)

L05[10]	**Boren's Laws:** **1. When in charge, ponder.** **2. When in trouble, delegate.** 3. **When in doubt, mumble.**
Measurement context	Assignment of responsibility and authority for performing a certain process, developing the work products and providing the services of such process.
Current flaw(s)	A common flaw in software measurement is a not completely clear assignment of responsibilities among the several people involved on such process
Potential risk(s)	Some data could not be properly gathered and therefore analysed at the established reporting timeframes, provoking a negative spiral about the usefulness of measures and measurement in general, at all levels, not perceived as fundamental process in the organisation's value chain from some operative project team members. Where a Balanced Scorecard (BSC) approach would be in place, the risk is that the whole BSC framework will fail, missing their corporate goals.
Missing opportunity(ies)	° A reduced / shifted (in time) data and information sharing among the several people involved with such responsibilities can lower the possibility to better balancing costs and optimising the ROI from measurement.
Related SPI reference(s)	CMMI ° GP 2.4 (Assign Responsibility)

L06[10]	**Brady's First Law of Problem Solving:** **When confronted by a difficult problem, you can solve it more easily by reducing it to the question, "How would the Lone Ranger have handled this?"**
Measurement context	Root-Cause-Analysis (RCA) should always run associating the proper measures and metrics to each element put on the fishbones
Current flaw(s)	Few organisations have a structured application of RCA in their Quality Management Systems (QMS). Another potential problem for those companies applying CMMI in its staged representation could be to postpone CAR implementation in terms of priorities because it's a ML5 PA.
Potential risk(s)	Often an "ad-hoc" solution is found for each problem; the misapplication of Root-Cause-Analysis (RCA) with other well-known TQM old tools could reduce the organisation's capability to group problems into "families of causes".
Missing opportunity(ies)	° Consequently, a lower capability to consistently apply RCA in your organisation can reduce the possibility to find out common solutions, which could allow cost-savings.
Related SPI reference(s)	CMMI ° CAR SP1.2-1 (Analyse Causes)

L07[10]	**Brook's First Law:** **Adding manpower to a late software project makes it later**
Measurement context	A general PM rule, valid also for ICT projects.
Current flaw(s)	Often historical projects data do not consider as a field the number of FTE (Full Time Equivalent) people working on a closed project and estimations are done using the experience and perception of Estimators on the base of supposed productivities for such estimated amount of work.
Potential risk(s)	The usage of experiential/analogous estimations (the first two "techniques" listed in the PMBOK2004 Chapter 6.4 on "Activity Duration Estimation") without using historical databases with a certain level of granularity and fields (e.g. type of SLC adopted, no. of FTE employed, MRE at the bid, analysis and closing phases, duration and schedule, etc.) can lead to higher projects' MRE and organisational MMRE.
Missing opportunity(ies)	° Improved effort and cost estimations and better people allocation against the required skills.
Related SPI reference(s)	CMMI ° PP SP 2.5-1 (Plan for Needed Knowledge and Skills) ° PMC SP 1.1-1 #5 (Monitor Project Planning Parameters)

L08[10]	**Second Law of Business Meetings:** **If there are two possible ways to spell a person's name, you will pick the wrong one.** **Corollary: If there is only one way to spell a name, you will spell it wrong, anyway.**
Measurement context	There are several aspects about meetings – and generally speaking inside an organisation – to keep under control, not only those ones discussed in CMMI, in particular those in Project Management areas.
Current flaw(s)	Often personal issues or communication issues, from a subjective and interpersonal perspective, are not subject of Tracking & Control activities, or are anyway evaluated in a *light* way, using typically subjective tools (i.e. surveys, interviews, …)
Potential risk(s)	As well known in Process Management approaches and models such as the Balanced Scorecard, Malcolm Baldridge and EFQM, the HR component represents the main (or one of the main) drivers for change. Not taking into account a series of cause-effect relationships could generate worse interpersonal relationships, with repercussions on working activities and on the overall organisational climate.
Missing opportunity(ies)	° It could generate a lower ROI on process improvement activities than expected.
Related SPI reference(s)	CMMI ° ML2: Communication & Coordination, CO1 (Executive management establishes and communicates a set of values for the organisation regarding the development and management of its workforce)

L09[10]	**Chemist's Rule:** **Never take more than three data points. There will always be some kind of graph paper on which they fall in a straight line** **Chemist's Rule, First Corollary:** **If you have only one kind of graph paper, never take more than two data points**
Measurement context	The more points are taken into account in a statistical series, the most affordable is the input for estimating.
Current flaw(s)	Sometimes a quantitative management is performed using few raw data points, often for a low frequency in data gathering or for non-historicisation of all potentially useful projects' data.
Potential risk(s)	Resulting values, because not enough to better describe a certain phenomenon, could lead to wrong conclusions, blaming that measurement is an high-cost practices with a low value returned.
Missing opportunity(ies)	° It could generate a lower ROI on process improvement activities than expected.
Related SPI reference(s)	CMMI ° PP SP1.4-1 (Determine Estimates of Effort and Cost) ° PMC SP 1.1-1 (Monitor Project Planning Parameters) ° QPM SP2.2-1 (Apply Statistical Methods to Understand Variations)

L10[10]	**Colvard's Logical Premises:** **All probabilities are 50%. Either a thing will happen or it won't**
Measurement context	Evaluate several possible alternatives, in particular during the project planning phase or after, during the project lifetime. Establish assessment criteria/methods the more objective as possible or – anyway – allowing a multi-facet benchmarking (during time, among business units, …).
Current flaw(s)	Often possible alternatives are mostly evaluated using subjective criteria.
Potential risk(s)	Such evaluations could present a lower % of affordability, increasing risk levels and consequently project/activities costs.
Missing opportunity(ies)	° A better project/activities monitoring, with a resource savings (not only HR) available to be timely allocated on new projects/activities.
Related SPI reference(s)	CMMI ° DAR SP 1.5-1 (Evaluate Alternatives)

L11[10]	**Law of Communications:** **The inevitable result of improved and enlarged communications between different levels in a hierarchy is a vastly increased area of misunderstanding.**
Measurement context	The measurement process involves several roles: who creates and defines a measure, who gathers data, who uses those data for his/her decision-making process.
Current flaw(s)	Lack of communication is a general problem: there is the need for a common and shared information, glossary, consistent usage of such measures within the organisation (i.e. how are defined and gathered data on defects or LOCs?).
Potential risk(s)	Whether such shared and common information, glossary and usage of measures is not in place, there is a high risk to have in return meaningless data to use for the decision-making process (i.e. mixing apples and oranges: Do a LOC include or exclude comment lines? Do we count a physical or a logical line of code?...)
Missing opportunity(ies)	° Measures can be meaningless and consequently the measurement process will lose consensus and ROI from the process improvement program could bring to the organisation a reduced value to the company.
Related SPI reference(s)	CMMI ° GP 2.7 (Identify and Involve Relevant Stakeholders)

L12[10]	**Rule of Creative Research:** **1. Never draw what you can copy.** **2. Never copy what you can trace.** 3. **Never trace what you can cut out and paste down**.
Measurement context	A new and innovative way of doing things can bring value into the organisation providing higher process performance levels.
Current flaw(s)	Companies using the staged CMMI probably do not consider OID for the implementation and also the measurement issues are less checked from a technical viewpoint, because creativity is perceived quite exclusively as a subjective issue.
Potential risk(s)	Do not take into account OID issues in a continuous way could lead to the loss of complementary information about how (economic) value was created within the company
Missing opportunity(ies)	° Next improvements probably will move from wrong assumptions and from the analysis of secondary process enablers.
Related SPI reference(s)	CMMI ° OID SP 1.2-1 (Identify and Analyse Innovations)

L13[10]	**Ducharm's Axiom:** **If you view your problem closely enough, you will recognize yourself as part of the problem.**
Measurement context	The Definition phase is the first and probably most important one within your own Measurement process.
Current flaw(s)	Not always needed measures and metrics are defined at the proper level of granularity for the decision-making process (too high-level or too low-level definition).
Potential risk(s)	In the low-level case, in RCA it is not possible to obtain in return critical information putting in evidence a root cause (i.e. if defect classification includes too many categories, absolute values will be more homogeneous, hiding possible problems).
Missing opportunity(ies)	° Less effective application of RCA.
Related SPI reference(s)	CMMI ° MA SP 1.2.-1 (Specify Measures) ° CAR SP 1.1-1 #1(Gather relevant defect data)

L14[10]	**Dykstra's Observation on Programming and Debugging:** **If debugging is the process of removing bugs, then programming must be the process of putting them in.**
Measurement context	Defect removal efficiency (DRE) and other typical test management measures are fundamental for obtaining a real process improvement.
Current flaw(s)	Often it is not captured the information about the SLC phase where the defect has been injected (not necessarily the construction phase). Another flaw could be to minimize the number of unit tests, confounding them with debugging.
Potential risk(s)	Higher cost for removing bugs and errors.
Missing opportunity(ies)	° Obtaining better a DRE within quality, time and budget
Related SPI reference(s)	CMMI ° VER SP 3.1-1 (Perform Verification)

L15[10]	**Finagle's Creed:** **Science is true. Don't be misled by facts**
Measurement context	Measurement & Analysis (MA) is one of the new processes introduced in the CMMI at ML2 for improving this way of managing an organisation, by facts.
Current flaw(s)	Often an organisation has in place a lot of measures, mostly from the subjective viewpoints, with Satisfaction Surveys at different levels and for various audiences, but with a reduced focus on the objective way. Decisions often are taken on experience and not always supported by numbers and historical data.
Potential risk(s)	Historical data is a powerful tool for supporting the decision-making process, not a perfect substitute for it or for managers.
Missing opportunity(ies)	° Historical data is a powerful tool for supporting the decision-making process, not a perfect substitute for it or for managers.
Related SPI reference(s)	CMMI ° MA SP 1.2.-1 (Specify Measures) ° MA SP 2.2.-1 (Analyse Measurement Data) ° DAR SP 1.1-1 (Establish Guidelines for Decision Analysis)

L16[10]	**Finagle's First Law:** **If an experiment works, something has gone wrong**
Measurement context	It is fundamental to gather data possibly from all traceable activities within the organisation and store them for future usages, allowing analysis for evaluating alternative solutions.
Current flaw(s)	Few mechanisms and budget paid for verifying and validating experiments and trials before they become part of the organisational Business Process Model (BPM).
Potential risk(s)	If not properly verified and validated in time, a certain solution includes hidden costs for its maintenance. "*The purpose of Validation is to demonstrate that a product or product component fulfills its intended use when placed in its intended environment*" (CMMI VAL process area).
Missing opportunity(ies)	° Delays for a full operational status, due to reworks, reducing performance levels.
Related SPI reference(s)	CMMI ° OPF SP 1.3-1 (Identify the Organisation's Process Improvements) ° DAR SP 1.6-1 (Select Solutions)

L17[10]	**Finagle's Third Law:** **In any collection of data, the figure most obviously correct, beyond all need of checking, is the mistake.** **Corollaries:** **1. Nobody whom you ask for help will see it.** 2. **The first person who stops by, whose advice you really don't want to hear, will see it immediately**
Measurement context	Data collection is just one of the phases of the measurement process, not the "measurement" itself. A data is not an information, but an information comes from derived data.
Current flaw(s)	Lack of data verification & validation in the measurement process.
Potential risk(s)	Derived information will be meaningless for decision-making.
Missing opportunity(ies)	° Il will be not possible to use the inner informative value inside data.
Related SPI reference(s)	CMMI ° MA SP 2.2-1 #4 (Analyse Measurement Data – Review the initial results with relevant stakeholders)

L18 [10]	**Skinner's Constant:** **That quantity which, when multiplied by, divided by, added to, or subtracted from the answer you get, gives you the answer you should have gotten *(See Flannagan's Finagling Factor)***
Measurement context	In some low maturity organisations or in fixed price contracts with a certain budget of FPs to be furnished - function points are derived using fixed price and average productivity levels as an input and not necessarily starting from a direct calculation (obviously, those results will be then argumented with a sort of backfiring method).
Current flaw(s)	FP is not used firstly as a technical measure and the size of the project is not necessarily representative of the technical assumptions or use for tracking the project progress (misalignment between the real size and effort with those declared/accepted)
Potential risk(s)	To under (or over)estimating the size, since cost-driven and not requirement-driven, with a subsequent cost impact
Missing opportunity(ies)	° The technical personnel will not necessarily use/approfoundish the understanding/usage of FSMMs. ° Probably an historical project database is not neither will not created in the organisation and it is/will be more and more difficult to derive some internal data about average productivities on projects.
Related SPI reference(s)	CMMI ° PP SP 1.2-1 (Establish Estimates of Work Product and Task Attribute)

L19 [10]	**Futility Principle:** **No experiment is ever a complete failure; it can always serve as a bad example**
Measurement context	Alternative solutions must be evaluated, providing quantitative figures for choosing the best one according to the established criteria. Data Analysis is fundamental for learning from your own past experiences.
Current flaw(s)	Not flexible and general solutions to a certain problem are often adopted, losing the heart of the question: is more important a certain solution per-se or solving a problem? (i.e. Waterfall vs XP for a Telco project, or if measuring the functional size using Use Case Points could bring more information that simply adopting an ISO recognized FSM method, etc…)
Potential risk(s)	Not taking into account the lessons learned (particularly those bad) is highly dangerous, with high probability to repeat bad lessons in the future (mostly if HR change during time and also the experiential issue is not so strong).
Missing opportunity(ies)	° To learn from past experience and have a short (retrievable) history.
Related SPI reference(s)	CMMI ° OPF SP 1.3-1 (Identify the Organisation's Process Improvements) ° OPF SP 2.4-1 (Incorporate Process-Related Experiences Into the Organisational Process Assets) ° DAR SP 1.5-1 (Evaluate Alternatives)

L20 [11]	**All 5-month deadlines must be met in 3**
Measurement context	CMMI says that "*The project's budget and schedule are based on the developed estimates and ensure that budget allocation, task complexity, and task dependencies are appropriately addressed*"(PP, 2.1-1). Quantitative estimates are needed.
Current flaw(s)	Excessive compression of schedules.
Potential risk(s)	Unbalanced achievement of goals from concurrent perspectives (at least these four ones: time, cost, quality, risks), as done i.e. in the Balanced Scorecard (BSC) approach
Missing opportunity(ies)	° Release the project within the planned quality, time and budget.
Related SPI reference(s)	CMMI ° PP SP 2.1-1 (Establish the Budget and the Schedule)

L21 [11]	**When in doubt, update your CV**
Measurement context	Always difficult to objectively measure people's skills, because its mapping (too huge and with so many *nuances* to be strictly defined).
Current flaw(s)	Skills are not always aligned to project's exigencies.
Potential risk(s)	Resource allocation not adequate to project's needs, with possible future problems in the project lifetime.
Missing opportunity(ies)	° Reduction of commitment and confidence by the Customer.
Related SPI reference(s)	CMMI ° OT SP 1.3-1 (Establish an Organisational Training Tactical Plan) ° PP GP 2.3 (Provide Resources)

3. SPI and Knowledge Management: which relationships?

One of the underlying concepts within SPI models is the definition and usage of several databases within the ICT organisation, containing processes and related work products, software life cycles, project historical data, lessons learned and so on. The above presented tables (that we could friendly call "*Murphy-SPI tables*") could be used as a possible experiential input for RCA, as previously discussed.

Anyway, some questions should be answered, in particular how people and processes are related. Performance Management models such as the Balanced Scorecard (BSC) [24] or the Malcolm Baldrige [25] or EFQM [26] models design a causal chain where human resources are the main enabler (in particular in the BSC, the Learning & Growth perspective) for activating the organisational change. In SPI models such as CMMI there are few references to knowledge and how it can bring value into processes, because out of scope in the model document to face this issue.

Because this assumption, a huge value will come from the experience of your employees, if used: this *tacit* knowledge should be *explicited* and shared within the organisation. Murphy-SPI tables could represent just one of the possible *knowledge asset* types that can be produced, making easier a real knowledge transfer among employees and possibly making less boring some technical trainings (that's why the title of this paper). A reference point is the work by Peter Senge on Learning Organisations ("the Fifth Discipline" series [16][21]).

A possible model for achieving this deeper knowledge from a Japanese viewpoint is the **SECI** model [20], which objective is to create and manage efficiently knowledge in an organisation. Three elements are considered: the process model, the *ba* and the knowledge assets.

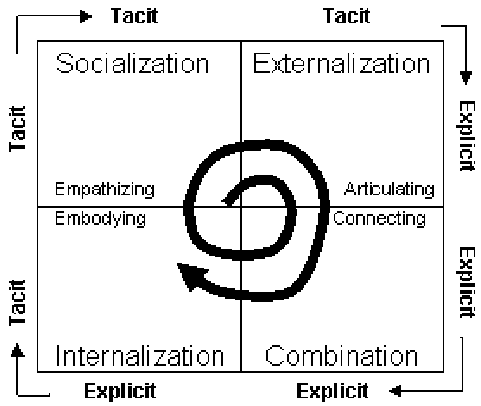

Figure 2: SECI Model (Nonaka & Takeuchi)

The basic idea, summarized in the below figure, is a four-phase process helping in making more explicit the tacit knowledge, using the *ba* (a Japanese word, which means a shared context in which knowledge is created and used through interactions).

Figure 3 shows a four-quadrant matrix classified by interaction type (face-2-face; virtual) and number of people interacting (individual; collective). Overlapping this matrix to the previous one helps in better understand how to achieve the single phases described in the model using four types of knowledge assets:

- **Experiential**: tacit knowledge through common experiences (i.e. skills and individual know-how; care, love and trust; energy, passion and tension)
- **Conceptual**: explicit knowledge articulated through images, symbols and language (i.e. product concepts; design; brand equity)
- **Systemic**: systemized and packaged explicit knowledge (i.e. documents, specifications and manuals; databases; patents and licences)
- **Routine**: tacit knowledge routinised and embedded in actions and practices (i.e. know-how in daily operations; organisational routines; organisational culture).

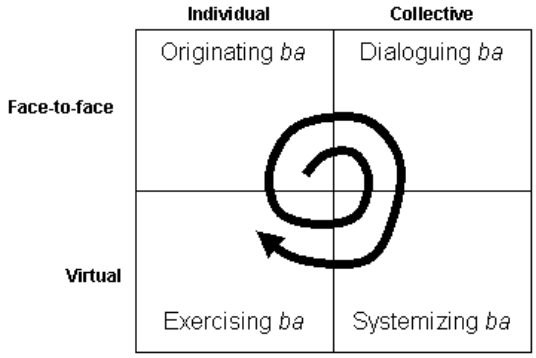

Figure 3: Four "ba" categories

In our paper, looking at the Murphy-SPI tables as possible knowledge assets, they could be classified in the second group, corresponding to the "Externalisation" phase in the model.

But there is no a direct link among KM models such SECI and SPI models. When sponsoring an SPI initiative, it is fundamental to enlarge the vision to a more comprehensive business view and considering at the same time several models from different but complementary domains. Some examples are the People CMM [23], or other MM-models, in general what we called the "MM-mania" [28]. Business Process Maturity Model (BPMM) [27], proposed by Bill Curtis, seems to be a possible model in this direction, putting together several pieces of the puzzle.

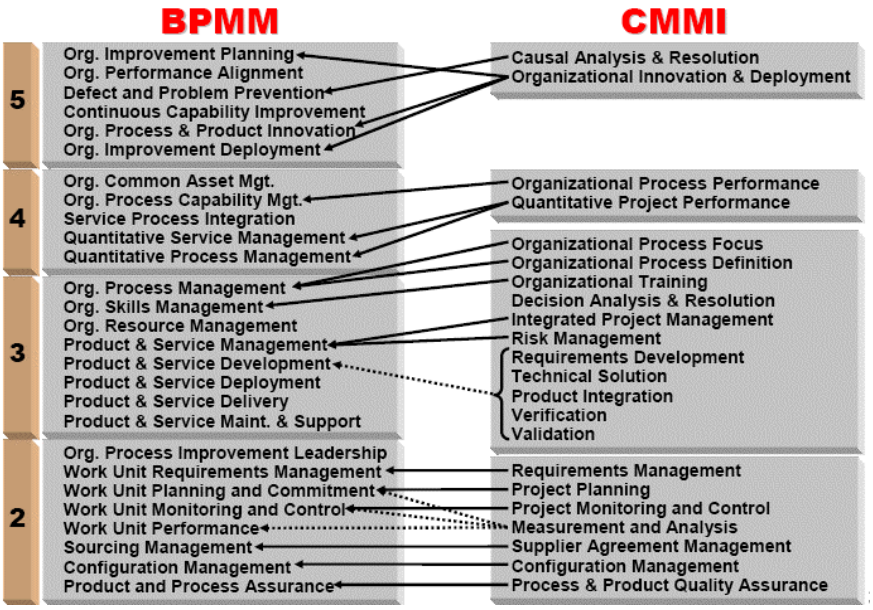

Figure 4: Mapping BPMM vs CMMI [27]

But the most profitable model is in any case your own Business Process Model (BPM), built during time using your "corporate knowledge" (to be explicited more and more) and based on your own needs. In the following figure a high-level mapping by PA between BPMM and CMMI is presented.

Thus, it will be useful to remember people as a central element when (re)designing the corporate strategy. There will be more probabilities of success if knowledge explicitation is run with a bit of humour.

4. Conclusions & Prospects

The willing of improvement is an inner part the human nature, but when applied to a non-personal context generates less motivation, in particular a strong resistance for measurement and monitoring activities, not perceived on a process, but on the person him/herself. Because people represent the core and added value for each organisation, the question is: which could be possible ways for reducing such resistance to measurement improving people skills to bring in everyday work and achieving better (organisational) performances?

Authors as Senge proposed various techniques within the so-called "Fifth Discipline"; our two cents are presented in this paper, proposing a funny approach to measurement, commenting and analysing from a SPI perspective some well-known Murphy's laws. These "Murphy-SPI tables" could help people in a Root-Cause-Analysis (RCA), reducing the distance between everyday life (the law) and the suggested solution (the SPI-related comment). Those tables represent a series of knowledge assets to create, modify and reuse with the parallel goal to make more and more explicit the corporate knowledge, creating added value for the organisation, as assumed in performance management models such as the Balanced Scorecard, Malcolm Baldrige and EFQM.

Finally, there is a strong need to avoid the "Silver Bullet Flu" [CAGL04], while improving your own Business Process Model taking into account several sources, models, techniques and ideas, not only a single reference model. The risk is that models do not capture the underlying real life but becomes their selves reference points, forcing people to follow them.

"*The most exciting phrase to hear in science, the one that heralds new discoveries, is not 'Eureka!' (I found it!) but 'That's funny ...*" (Isaac Azimov, US science fiction novelist, 1920-1992).

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