Organisation, and Information Systems between Formal and Informal
Continuum, Balance, Patterns, and Anti-patterns

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Abstract: There is no doubt that formalising information systems is of great value to an organisation. This enables, among others, business processes, rules, services and objects models to be standardized, structured, capitalized and reused. A formal information system involves a structured organisation, clearly defined roles and responsibilities and therefore a rational management. However, generalising a formalisation approach to all information system perspectives or all levels of granularity can inversely be fatal to the smooth running of the business, its management, and operation. The aim of this paper is to explore information systems formal-informal continuum, to discover and understand its characteristics, patterns, anti-patterns, and the forces partcipating to its equilibrium, and to propose recommendations to reach right level of formalisation*.

1 INTRODUCTION

Formalisation [1] **- From Object to Form.** Throughout its evolution, man has always used the formalisation more or less explicit for his needs of survival, communication, memory, friendliness, trade, war, etc. He shared his ideas by gestures and sounds, then transcribes his ideas and sounds in writing. Then, he changed his writing system (based on pictograms, ideograms, and phonograms) and tools for these writing systems (reed and clay tablet, papyrus, paper). Long after, man has delegated the reproduction of his writing he has formalised to machines (invention of printing). Man then knew mastering energy by inventing the steam engine he has replaced after by the electric motor. He made remarkable progress in all theoretical and experimental sciences (physics, chemistry, biology, etc., but also economics, psychology, sociology, etc.). He has delegated his duties he has rationalised and formalised by programming machines to reproduce them faithfully (system automation, computer science, robotics, etc..), He even formalised learning mechanisms and delegated to the machine tasks of decision making or at least decision support (application of pattern recognition on events in critical environments, dashboards and automated governance of complex systems, application of game theory in economics, application of bio-medical technologies, etc.). The evolution continues and with it the process of formalising ideas. For (Fraser et al., 1994), formalisation process may be direct (transition informal to formal) or transitional (transitions informal to semi-formal then semi-formal to formal).

The aim of this paper is to explore information systems formal-informal continuum, to discover and understand its characteristics, patterns, anti-patterns, and the forces partcipating to its balance.

Human and Formalisation

Example of implicit formalisation - man and bodily faculties externalisation. According to (Serres et al., 2004), what is a hammer else than a fist with a forearm, which fell to our arm. The technique was invented by outsourcing a bodily factulty. Actually, there exists a mechanism that produces continuous despecialisation of human organs. Human being is unique in his capacity to lose a faculty and to develop

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[1] To **formalise** is (i) to give (something) legal or formal status (*a year has elapsed since the marriage was formalised*), (ii) to give a definite structure or shape to (*we became able to formalise our thoughts*) (OUP, 2012). **Formalisation** for Husserl, is precisely the relationship of an object to form (Quesne, 2003). (Ostrom, 2009) distinguishes between *rules-in-form* (dead letters) and *rules-in-use* (actually followed) (Kingston and Caballero, 2009). **formalisation** means a reduction in personal and relational elements of coordination and an emphasis on objectively documenting decisions, discussions, and work processes (Meijer, 2008).

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others. In instrumenting, and transforming his body, the human is involved in a endless loop of transsubstantiation that is transmitted by using technical objects (Serres, 2001). In fact, externalising his organs to objects (first hominescence loop), humanity has freed itself from species adaptation mechanisms (exodarwinism). Invention of first tools has freed human being from evolution towards culture. Since the technique appears, the human exit from evolutive laws, his body changes sparsely, but his adaptation becomes very quick. We believe that bodily faculties externalisation includes, among others, a continuous formalisation mechanism of (*"defining a shape to"* (Quesne, 2003)) objects, tools, and processes necessary to achieve human tasks.

Example of Explicit Formalisation - Human Writing Systems. According to (Wilson, 2005), all writing systems followed the same general progression. The first actual writing was *pictographic* or iconographic where a simple picture designated a real object. Generally the pictures were very simple and abstractions of what we might think of as a drawing (a drawing of a deer represented a real deer). A stylised picture is called a pictogram. Gradually the pictures were formalised and also began to be used to represent relationships and ideas as well as objects. This is called *ideographic* writing. A symbol standing for an idea is a semantic sign and is called an ideogram or logogram (a picture of the moon could represent the idea of night or darkness as well as that of the moon itself). Also, the sounds corresponding to pictograms are combined to form a word. This can markedly reduce the number of symbols required for a full writing system. Symbols representing sounds are called *phonograms*. All writing systems are a combination of phonetic and logographic elements but the proportions of these two elements vary among languages (for instance, French and Finish are more phonetic than English, while, Chineese and Japaneese are more ideographic). We think that all informal, semi-formal and formal languages, and notations used to represent information systems, are only results of this continuous process of writing system formalisation based of pictograms, ideograms, and phonograms.

Formalisation - From Human to Entreprise Activity. If man is the heart of the enterprise, any analysis of phenomena in this business cannot be conducted without considering the evolution of man from micro and macro viewpoints. Thus, *could not we make the analogy between the development of the enterprise and the development of man both as an individual and a species? Could not we make the analogy between the analysis of the formalisation aspects in the enterprise and the study of the formalisation evolution accompanying human species evolution?* The analysis of human development was conducted using two approaches: micro and macro. The microscopic approach (*ontogeny*) focuses on human individual biologically and psychologically from conception, birth, development, maturity, aging until his death. As for the macroscopic approach (*phylogeny*), it analyses man development as reproducing the evolution of the human species in relation to his instincts, reflexes, emotions, language development, motor skills, biped posture, games, intelligence, interaction, social life, ledearship, etc. We will look at the second point of view to try to understand the enterprise through the evolution of man in a macroscopic scale. Businesses did not they (i) **start by improving their oral culture and visual communication** (sounds and gestures) internal (customs, rumors, discussions, meetings, etc.) and external (corporate identity, advertising slogans, informal marketing, communications and audio-visual marketing, etc.).? Then, companies, did not they (2) **develop their written culture** either formalised (official letters, orders, hierarchical escalation, coorporate public communication, newspaper articles, patents, etc.) or informal (or rather deformalised: e-mail, web 2.0, blogs, vblogs, wiki, professional social networking, etc.).? Companies, did not they, for capitalising their memory, standardising their interactions, and controlling the quality of their products and services, (iii) **opt for cartographying their knowledge, strategic know-how, and their operational information systems** (business and organisational visions and strategies, knowledge, quality manuals, management processes, business processes, business rules, procedures) in a semi-formal style based on pictograms and ideograms (graphic notation and symbolic with flexible semantics)? Did not they, since the advent of information technology and communications, (iv) **project their information system into more formal electronic and computer frames** (physical computer infrastructures, telecoms, networking and embedded systems, security directories, rules engines, computer applications, governance dashboards, etc.) in order to be automated, measurable and therefore improvable? Table 1 shows some artifacts examples having evolved through a formalisation process.

2 INFORMATION SYSTEMS BETWEEN FORMAL AND INFORMAL - MODEL

We will never over emphasis on the formalising power

Table 1: Examples of artifact evolution at entreprise level and their formalisation process.

Origin artifact	**Purpose of formalisation**	**formalised artifact**
oral culture	*preservation of knowledge*	writing culture
paper data	*dematerialisation*	digital data
handwriting	*externalisation of bodily faculties*	printed writing (keyboard)
information system	*modelling*	information systems models
manual procedure	*dematerialisation & automation*	automatic procedure
real information system	automation	virtual computer system
line work	*dematerialisation & automation*	automated process
physical (in-house) computer system	*virtualisation & outsourcing*	virtual (out-house) computer system
real bank counter	*virtualisation*	automated teller machine
real agency	*virtualisation*	virtual office (online)
real money	*virtualisation*	electronic money
real machine	*virtualisation*	virtual machine

of informal style. In fact, it is, often better, to prefer the informal style instead of semi-formal or even formal styles to provide a good knowledge description, sharing, sustainability, implementation and operation. Do not they say, "A picture is a thousand words"? According to (Renaud, 1995), (Enriquez, 1990) has noted: "Organisations have never been only formal, functional, impersonal. Even in the most rigid bureaucracies, there exist informal relations, groups based on elected affinities, on the work necessity, on the circumvention of rules, or collective defense. Any organisation contains within itself diverse communities, micro-cultures and is a place to live not just a workplace". (Stamper et al., 2000) highlights that organisations that learn most easily are often those able to work well informally. He adds that classical methods tend to increase the proportion of formality in an organisation without drawing attention to the possibility of meeting requirements by improving or extending the informal part of the organisation. For (Schmidt and Bannon, 1992), no formal description of a system (or plan for its work) can be complete.

The formal is best used for predictable and repeatable work that needs to be done efficiently and with little variance. The predictability and repeatability of the work warrants the effort to develop the infrastructure of the formal organisation, which can be documented and constantly improved upon to improve efficency and remove variation. Many of formal processes and tasks can be and have been implemented over the years. Payroll distributions are a good example. Conversely, the informal is best applied against unpredictable events. Issued that arise outside the scope of the formal organisation are often surprises that need to be sensed and solved. Increasingly, pepole who need to do the solving need to be motivated outside the reward system, collaborate across organisational boundaries. Every organisation must deal with both predictable and unpredictable work, that is why it is necessary to learn how and when to call on the logic of the formal and balance it with the magic of the informal (Katzenbach and Khan, 2010).

The information that must be distributed in a human activity system indicates that two separate information systems must be considered. One is implemented through policies and processes (that is, the formal information system), whereas the other (the informal information system), ties the people in the organisation together. If something goes wrong with the formal system, we still need experimented people to fix it (Flatau, 1988).

Informal information systems complement formal systems. They are more spontaneous and provide for flexibility and adaptation yet they may themseleves suffer from bias and noise. The key design decision is where to draw the line between the formal and informal and to monitor continuously the dividing line. This may mean, on occasions adopting an unofficial system and formalising it, or ceasing to produce information which becomes inappropriate (Lucey, 2005). For (Howarth, 2005), formal information systems consist of rules and procedures, while informal information systems rely on common practice and common sens of the organisation's employees. Informal information systems usually arise from restraints or inadequacies of the formal system. By filling in the gaps in the formal system, the informal system creates an added flexibility to the way in which the organisation functions. Ideally, the two systems should complement one another. However, unless managers monitor the interaction between the two systems to ensure that they are working together effectively, there is a danger in having the two systems (Howarth, 2005).

Formal Information systems (particularly *information retrieval systems*) are developed to be consulted and queried in purposeful ways, meaning that users must have some idea of what they need to know. While, informal information systems generally evolve from the *bottom up* rather that the *top down*, emerg-

ing directly from the community of users. By the way, even if teanagers do not clearly differentiate beween informal and formal information environments, it certainly appears that formal information systems are loosing out with the teen audiance who use them only when required to (Harris, 2011).

This section studies duality, continuum and balance between formal & informal and between formal & informal information systems in particular.

2.1 Informal - Formal: *Duality*

The contribution of informal is undeniable for the enterprise, it complements the formal. In (Renaud, 1995), informal (*badly named*) is not a "complementary" resource that should be "formalised and rationalised", the form hits the formlessness which makes it live. For instance, informal communication channels complement the formal communication channels when they are no longer sufficient or are no longer adequate (Amosse et al., 2010). Also, instead of destructuring effects by which the informal sector is designated, it is its complementarity with formal mechanisms that is nowadays highlighted, which significantly alters the approach to problems (Désert, 2006).

Companies that balance between their formal and informal organisations, retain the efficiency and clarity of the well-defined structures that define the formal organisation while also capitalising on the flexibility and speed of the social networks (Katzenbach and Khan, 2010). (Renaud, 1995) calls the formal and informal a "notional couple" where one does not combine without the other. According to (Kingston and Caballero, 2009), for the first half-century of its existence Lloyd's insurance operator had virtually no formal structure at all, and when a formal structure was eventually created, largely as a result of the impetus provided by the Napoleonic wars, formal rules were adopted mainly *to systematise a practice which had already been adopted to meet the requirements of commerce as they arose*. Even then, informal rules and reputation mechanisms (not written down, ethical codes or moral, social norms and conventions) remained the dominant mode by which participants at Lloyd's were constrained from opportunistic behavior. Business practices which evolved acquired the force of informal custom long before they were systematised as formal rules.

According to (Foudriat, 2007), the extent and nature of the informal have led some theorists to propose a metaphor comparing the organisation to an iceberg, where the emergent part corresponds to the formal aspects (behavior related to the organisations scientific approach), while the submerged part, consists of individuals strategies, affective ties, coalitions of groups, power relations. (Foudriat, 2007) studied informality in three views:

For scientific management (Taylorism) single rational point of view, *the informal is considered as a temporary residual rationality deficit that new formal rules will reduce or to remove*. While human relations school (including surveys of Elton Mayo at Western Electric), considers that *the informal includes goals and psychological needs of individuals which can neither be filled, nor reduced, nor manipulated by rational logics, and which are in shift with the local order that the formal organisation seeks to impose*. Informal and formal are two opposite and irreducible sides of the the organisational phenomenon. For systemic and strategic analysis ((Crozier and Friedberg, 1977) surveys), *the informal is not limited to the psychological needs of individuals, but includes the interests centered power games that individuals find in the formal organisation.* Informal behaviors are seen as strategies.

We believe that **each formal system, has and depends on a dual informal system (***complementary* **image) more important** (*duality* or *dichotomy*). **Both systems evolve in parallel and interact continously**. There exist several examples of formal/infomal duality in the entreprise. The idea of the duality of formal/informal information systems is, by no means, a simplistic binary polarity of information systems states, but a consideration of the possible levels of formalisation of information systems between the two limits: over-deformalisation and over-formalisation. Evaluation of this duality is closely related to the size and business of each organisation or part of organisation (department, business unit, etc.).. The following sections are intended to define the different concepts characterising this duality.

2.2 Informal - Formal: *Characteristics*

Degree of Formalisation/Deformalisation. The formalisation (respectively defomalisation) degree of a system is a qualitative value that evaluates on a discrete scale its level of formalisation (respectively deformalisation). The level of formalisation is an attempt to model discrete steps defined in a universe of infinite posibilities between two limits: over-deformalisation and over-formalisation. The degree of formalisation (deformalisation respectively) may be called "degree/level of standardisation" (Hughes et al., 2005; Ross et al., 2006) (respectively deformalisation (Delzescaux, 2002)). (Hughes et al., 2005) mentions that the degree of formalisation of an organisation depends on its size and nature of work (for in-

stance, a production unit cannot have the same degree of formalisation that a unit of R&D).

Gap between Formal and Informal. The formal-informal gap is the difference between the degree of formalisation and deformalisation of a system and its dual at a given time (peak-to-peak - *ptp*). The gap is a discrete value not necessarily positive. (Delzescaux, 2002) calls this gap "synchronic" (as opposed to "dyachronic gap" which measures the difference between formal and informal systems at two different instants in time). Furthermore, (Delzescaux, 2002) noted that the larger the gap in society, the greater the distinction between social classes (one could project this gap on the depth of a hierarchy in an organisation, that (Hughes et al., 2005) called vertical complexity of an organisational structure). (Delzescaux, 2002) adds that the reduction of this gap indicates a shift in the balance of power (which we will define later as *the center of gravity of the couple formal / informal*).

Centre of Gravity of Formal-informal Couple. The center of gravity of formal-informal system couple is a point representing the balance of power between formal and informal. (Renaud, 1995) says the forms are not of the same rigor, the same mass, the same power of attraction and energies conformation. Between volunteering and professional relationship, between the community and the public network, there is a mass difference, that when it differs, the attraction/conformation are changing from one to another. The center of gravity of formal-informal couple follows the metaphor of the formal / informal iceberg evoked by (Foudriat, 2007). In fact, moving the center of gravity of an iceberg is sufficent for the iceberg to capsize or roll on itself. We can confirm this analogy through (Delzescaux, 2002) who talks about the balance of formal/informal power. Indeed, shifting the center of gravity of the couple formal/informal is a characteristic of a regulation (search for the balance of forces governing them).

Trail of Formal-informal Couple. The area delimited by fomal and informal systems time evolution defines the trail of formal-informal system couple. *The trail records the different levels of information systems formalisation*. If an information system is at a certain level of formalisation, behaviours of differents actors of this information system should be considered not only through the current formalisation level, but also through (1) the whole history of information system formalisation, (2) the history of dual informal information system formalisation, and (3) the trail contained between the two formalisation evolution histories.

2.3 Informal - Formal: *Continuum*

Complementarity between formal and informal supports a kind of it continuum which ensures the move from one to the other in a continuous way. If the transition from informal to formal is insured by formalisation, the dual transition from formal to informal is provided by deformalisation. Knowledge deformalisation, according to (Volckrick and Deliège, 2001) is to defer the weight of problems and conflicts resolution mainly on participating parties (e.g., for (Deliège, 2010), knowledge deformalisation is also reflected in the fact that the patient become himself well informed about his illness, or on the fact that all the actors involved in a problematic claim as legitimate their point of view and "experience know how" on some situation). In addition, justice procedures deformalisation is easing rules by the players or the law itself (Cadiet, 2008). Table 2 shows some examples of formal artifacts deformalisation.

Based on the work of (Crozier and Friedberg, 1977), (Livian, 2004) emphasizes that there is a close relationship between formal and informal. In fact, in learning situations, for example, deformalising formal is taking the risk to formalise what is by nature informal (over-formalisation duality) (Brougère, 2007). Thus, replacing traditional training situations (formal artifact) by less formal projects debrieffing situations (intermediate situation between formal & informal) is trying to transform informal learning activities (dual informal artifact) to in more framed learning while one cannot eliminate the role of informal learning.

According to (Kingston and Caballero, 2009) informal constraints are the major source of institutional (formal) inertia, because (i) they continue to exist within formal rules that they were prior configurations, and (ii) they change in an incremental slow evolution. The influence of informal on formal rules is not wholly conservative, *cultural endowments* can actually make some kinds of institutional change easier. He gives the example of Japan, where he argues that *traditional patterns of cooperation* which emerged in the distant past facilitated modern rural development programs. (Kingston and Caballero, 2009) highlights the importance of temporal dimension when he consideres the role of the whole organisation past evolution systems current change. Thus, **formalising process is not a choice but an evolution**.

One can deduce, with generalisation, that **deformalising a formal system returns to formalising its dual informal system** (*negative correlation*). This type of correlation can also connect systems not necessarily formally dual. Also, **ability to formalise a system depends on the preparation of other infor-**

Table 2: Examples of deformalisation processes in organisations.

Formal artifact	Purpose of deformalisation	deformalised artifact
"formal" hierarchical mail	*make bureaucratic communication more flexible*	"informal formalisation" (e-mail) (Meijer, 2008))
autocratic management	*involve the group in decision making*	permissive management
classical innovation	*put the individual/user in the center of innovation*	open innovation
classical leraning	*democratise access to knowledge & cost sharing*	e-learning
personal computers	*favor mobility*	intelligent tablets
real networks	*banalise professional networking*	virtual networks
workflow	*give more freedom to the user handle the unpredictible*	groupware & advanced case management
web with passive users, etc.	*integrate social dimension & crowdsourcing in knowledge production*	web 2.0 with wiki, etc.
SOAP + WS-* web services	*reduce dependences to protocols & static formats*	RESTful web services (light stack)
relational databases	*efficient & scalable data storage for distributed environment*	*NoSQL (Not Only SQL) databases*

mal systems on which it depends (*positive correlation*). In this *continuum* between formal and infomal, **there exists a dynamics acting between formal and informal systems in space and time.**

3 INFORMATION SYSTEMS BETWEEN FORMAL AND INFORMAL - BALANCE, PATTERNS, AND ANTI-PATTERNS

If there exist a *continuum* between formal and informal, dynamics of this *continuum* is governed by a *regulation* of power between different systems producing a state of stable equilibrium. If research works affirm the existence of this equilibrium (balance) (e.g., (Hesse and Verrijn-Stuart, 2000; Purao and Truex, 2004; Ailawadhi and Heller, 2010)), they do not study the problem in depth and think that formalisation can respect that balance through a decision rather than considering power evolution between formal and informal systems[2]. Certainly, we must choose a useful and pragmatic formalisation (necessary and sufficient) rather than a purpose-less formalisation, disconnected from the priority needs of in-progress projects, but what is more important is to consider the whole organisation eco-system in a systemic (*holistic*) vision.

We believe that **the** *continuum* **between formal-informal information systems finds its balance through regulation cycles of those information systems** (series of oscillations formalisation-deformalisation until an equilibrium position). Levels of *insufficient-formalisation* or *over-formalisation* are relative thresholds that vary over time. Also, information systems cannot be compared against a level of formalisation except if they have the same characteristics and evolve in the same context. Regulation between formal-informal information systems respects the formal/informal iceberg metaphor evoked by (Foudriat, 2007). Moreover, a floating body (e.g. a ship) does not hold for a moment its stable state, but it continuously oscillates around this state. More particularly, the movement of an iceberg depends on its characteristics (density, thickness, shape) and is affected by external phenomena: ocean currents, winds push, wave action (when storms), Coriolis force (iceberg drift). Also, each iceberg has its own iceberg oscillation period depending to its characteristics and movements of its center of gravity enough to capsizing or rolling. Figure 1 shows four states of the dual formal/informal information system couple including three anti-patterns.

1. **Formal/Informal Stable Equilibrium:** deformalisation of a formal information system leads to a logical and normal deformalisation of dual informal information system and vice versa without neither important gap nor overlap (i.e. neither instability nor over-fomalisation/over-deformalisation). The application of the iceberg metaphor means that the center of gravity of the formal/informal couple remains stable. The state of *stable equilibrium* represents a highly desired situation (*pattern*). (Ring and van de Ven, 1994) denotes the formal/informal equilibrium state as a *situation of organisational cooperation*. (Katzenbach and Khan, 2010) mentions that managers, are able to motivate their people to higher levels of perfor-

[2](Ailawadhi and Heller, 2010) offers a best practice to achieve this level of formalisation just by modeling just-time (JIT) *just-enough* architecture that reflects the business requirements and technical available resources.

mance, not by enslaving workers with rigid *top-down metrics* or by being nice to all and making friends. Their approaches were neither hard nor soft. Instead they took the best of both the formal and informal organisations and integrated them to drive their people and partners to a shared purpose. While on a business trip to China, a manager of Bank of America was notified about an exceptional performance accomplishment at TeleTech. He wanted to congratulate everybody, which meant schedulting a call during a shift change. The only time he could arrange that was at 3AM local China time. The fact that Sheehy would make a call at that hour made his words of congratulation all the more meaningful to the TeleTech employees. In just a few months, TeleTech's call center rose from last place to fist place among BofA's call centers. While Gregg Sheehy has very little formal authority on TeleTech staff, he could find a balance between formal imperatives with informal mechanims in ways that would create the *emotional commitment* and energy needed to change behaviors to push Teletech up the ladder of performance results.

2. **Formal/Informal Instable Equilibria:** there are two kinds of instable formal/informal equilibria, (i) the first is characterised by a deformalisation of a formal information system that meets the formalisation of an informal dual system so that we no longer distinguish the two dual systems (zero formal/informal gap). Instability comes from the fact that this gap may become negative and cause *an over-deformalisation* of the formal information system. (ii) The second instable formal/informal equilibrium is characterised by successive information system formalisations that may yield, if repeated, an *over-formalisation* of the formal information system. Unless managers monitor the interaction between the formal and informal systems to ensure that they are working together effectively, there is a danger in having the two systems (Howarth, 2005). (D'Adderio, 2003) mentions that the interactions between formal tools and informal practices can be described as a fragile, unstable equilibrium, characterised by never-ending frictions, loose ends, and unforeseen consequences. While devices or routines may be created to 'fix' recurrent tensions, these will also tend to generate new problems. (Gerrard et al., 2001) warns against the over-formalisation and over-institutionalisation by promoting creative situations known to be instable, chaotic and disorderly and maintaning a kind of *structured informality*. States of instable equilibria are called "*chaos border area*" by (Stacey, 1992) and are known to be states of creativity and innovation.

3. **Over-deformalisation of Formal Informal System:** deformalisation of formal information system drops below the minimum informal limits for formal system for this system (this leads to a formalisation of the dual informal system beyond the maximum formal limits for informal system -**over-formalisation of informal IS**-). State of *over-defomalisation* is an *anti-pattern*. Suppose the organisation moves into a new market or increases its workforce so that the nature of the organisation is changed or developed in some way. The flexibility created by the informal system allows the changes to be accomodated without any revision to the formal system. This is acceptable up to a point, but, it means that the informal system is overriding the formal system and therefore the effectiveness of the formal system has decreased. As a result, the managers' knowledge of the way in which the organisation functions has decreased. This means they have lost control to some extent (Howarth, 2005). We categorise the state of *over-deformalisation* as a chaos state by (Stacey, 1992).

4. **Over-formalisation of Formal Informal System:** formal information systems follow a succession of formalisations more and more complex without any regulation (this leads to deformalising the dual informal information system in the same pace -**over-deformalisation of informal IS**). The causality may be reversed: (2) may precede and yield (1). This state is characterised by an abnormal growth of formal/informal gap. State of it over-defomalisation is an *anti-pattern*. (Gerrard et al., 2001) describes over-formalisation as "the obsession by the processes instead of results." (Lewis et al., 2010) adds that over-formalising the collaboration can impede what a few informants called the open dialogue of the collaborative process. Regimented agendas and too many subcommittees were common symptoms of an over-formalised collaboration. We categorise the state of *over-formalisation* as a chaos and messiness state by (Stacey, 1992).

Even if we take the notion of "chaos" from (Stacey, 1992), we do not agree with him on several points of classification of business states. While, R. Stacey highlights the equal importance of formal and informal organisations and advises managers to consider both formal processes and structures and informal systems, he did not study the subtleties between formalisation and over-formalisation and their dual state deformalisation and over-deformalisation. He badly transcribed this duality as he called nonlinear feedback system when it defines a linear transition relationship between chaos, instable equilibrium and stability flattening formal/informal duality. This flattening pushes R. Stacey to qualify the state of over-formalisation (that he called "ossification") as a state of stability and state of over-deformalisation (that he

Table 3: Semantics of formal/informal states.

Formal system state	Dual informal system state	Semantics	(Stacey, 1992) Enterprise state semantics
over-formalisation	over-deformalisation	obsession by processes instead of results	
instable equilibrium		endless frictions between formal & informal	**chaos border:** tensions & innovations
stable equilibrium		organisational cooperation & regulation of powers	**stability:** harmonious, orderly & with previsible repetitions
over-deformalisation	over-formalisation	loss of control	**chaos:**paradoxal, conflitual, fractal & infinitely creative

called "disintegration") as a state of instability. However, the two states in terms of formalisation, are dual chaotic states, one testing the limits of form and the other testing the limits of formless. The same flattening, pushes R. Stacey to consider a single state of chaos, certainly unpredictable, but rich of conflicts, paradoxes, and innovations counter-balancing the stable equilibrium state. Thus, R. Stacey has considered only a single instable equilibrium state, in middle way between chaos and instability, characterised by tensions predicting the chaos. The fact that he ignored the formal/informal dualilty in his classification, it was forgotten that the stable equilibrium is, in turn a middle way between formal and informal instability.

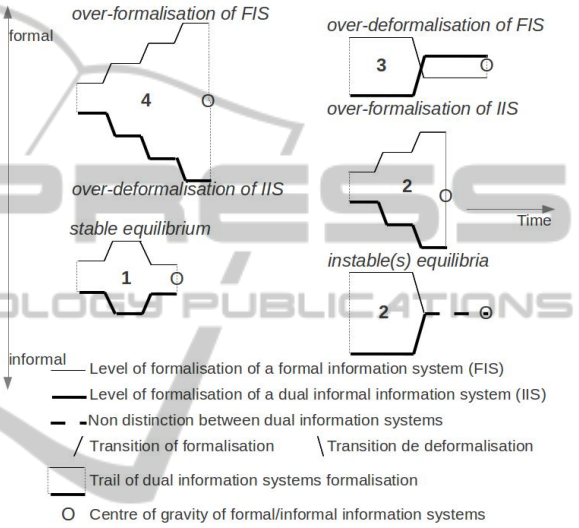

Figure 1: Correlation between dual systems in all states.

4 CONCLUSIONS AND PERSPECTIVES

Computing, based on mathematical rigor and rationality of scientific management, has strongly inherited of the defect of formalising and rationalising everything, even the most ordinary tasks or the most unique events. This excessive use of meta, axiomatisation, and abusive rationalisation has exceeded hard sciences to reach also social sciences (economics, management, psychology, etc.). As far as we study this phenomenon from information systems formalisation point of view, companies can be found in five different states: two extreme states (i) state of over-formalisation and (ii) state of over-deformalisation, (iii) one state of formal/informal equilibrium, and (iv) two states of instable equilibrium, the first predicting formal instability, and the other predicting informal instability. The purpose of this paper is to highlight the importance of the informal, and to study information systems formal/informal duality, *continuum*, and formalisation patterns and anti-patterns characterising formal/informal regulation cycles. The originality of this work is its approach genericity towards formal/informal enterprise facets, which ensures its applicability to study several problems. Our current works aim to apply our model to organisational and technical problematics within enterprises.

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