Why (an) Ethics code for information system development needs institutional support: there is even an upside for computing practitioners and businesses

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Abstract: Information systems development fails relatively often. This paper briefly covers some recent research into the reasons why information systems development can fail, and concludes that one cause of the lack of control over the project and failure to communicate.

This paper then proposes that attempting to regulate information systems development projects with parliamentary law is not feasible, and proposes that a multilevel regulatory approach is more suitable. Such an approach has been successfully adopted for regulating auditing. This paper also proposes that a third party specialist whose mandate is to supervise the information systems development project would be beneficial for meeting project goals.

The benefits from adopting a regulatory approach that incorporates soft-law regulation include faster adaptation of regulation to technological development, fewer failures of information development projects and less negative impact on third parties.

The benefit for information systems providers is that clearer rules regarding information systems development would reduce the risk of contract liability.

Keywords: information system foremen; ethics; soft-law; regulation; information system development project

1. Introduction

Information system development projects seem many cases fail to meet their goals and major delays of schedule take place. Several causes for the failure or success of a project have been found, such as: project leadership (Nixon, Harrington, & Parker 2012), failure of fitting information system for the needs of the organisation(Strong & Volkoff, 2010), over optimistic schedules and budgets (Lee, Keil, & Kasi 2012), etc. The underlying problem seems to be that projects seem to fail because some crucial issue(s) or aspect(s) of the project is forgotten or even ignored. Nevertheless, we claim that one critical issue is that a project often lacks an individual – even though project manager has been appointed - who has an understanding of the whole project and the authority to change the course of the project or even cancel it altogether if necessary. This means that aforementioned issues or aspects may not receive sufficient attention because of lack of authority or understanding of the project as a whole. If there is a dearth of authority coupled with mastery over the project it is then difficult point at one actor or another as the responsible party.

It has been argued that software designers have an obligation to act morally also in the conduct of their duties. Gotterbarn (2001) comes to a conclusion that it is typical that not apprehending the full impact of information systems on users or third parties is the result of not stopping to think rather than a conscious decision to not act ethically. But, if designers or information system developers have no actual authority over their own course of conduct how could they been expected to act morally – one must have possibility choose if we claim that one makes moral act.

This paper accepts the arguments made by Gotterbarn, Miller and Rogerson (1999) that infor-mation systems designed by a process that encourages rather than discourages ethical behaviour will tend to have less negative impacts on third parties and less unforeseen negative impacts on the intended users of the information systems.

The problem for acting in accordance to these codes is, then, is that the incentives to acting ethically are insufficient to encourage ethical reflection. Because that quality is thus seen as a rarity, an employer would have to go out of their way to hire ethically oriented computing practitioners, imposing costs on themselves. (Gotter-barn 2001, Ziman 2001)

While it may be said that needless regulation ought to be omitted, much like needless words in a text, the difficulty of discerning that which is needless arises in both cases. Considering the im-pact of information system on the lives of citizens the idea of regulation aiming at better information system development could perhaps be entertained.

This paper assumes the contract for purchase of information system refers to United Nations Convention on Contracts for the International Sale of Goods (hereinafter CISG), because a comparative law approach would be well beyond the scope of a this paper. Furthermore, CISG article 6 specifically states that contract parties may exclude the of

application of CISG. E contrario if such a provision is not included in the contract, and the parties's places of business are in two different signatory countries, CISG applies to the contract.

Information systems providers stand to gain from following ethics codes: under CISG article 45 if a seller fails to perform their contractual duties, the buyer may claim damages. This is a natural consequence of the ancient principle pacta sunt servanda - contractual obligations must be performed.

Ethics codes are relevant to liability because they can be used to show how the consensus of the industry itself states the provider should have conducted themselves. If the provider can be shown to not have acted in accordance to a code that prescribes a certain standard of careful conduct, they will have difficulty in showing that they are exempt from liability on basis of CISG article 79.

This follows from the fact that that an industry standard for the discharge of duties is also a statement as to what kinds and severities of unexpected untowards events, i.e. impediments, ought to be planned and prepared for. CISG article 79 states that grounds for exemption only exist if the seller cannot reasonably be expected to have been able to anticipate or overcome the impediment. Thus, if the impediment is of the type that a software engineering ethics code outlines, it seems reasonable expect an information system provider to be aware of these possible impediments.

On the other hand, auditors have stringent standards of care, but can be exempt from liability by documenting their carefulness via so called 'working papers' that document the decisions made in the conduct of their duties. Thus the existence of high standards of care do not create an automatic liability in the case of failed performance. This paper will examine whether information system projects could be better regulated by following the regulatory model of auditing and also attempts to present a solution to the difficulties in regulating information system.

2. Difficulties of regulating ICT

Regulating ICT is a notoriously difficult task. In the figure below (figure 1), techne is the set of available actions using a piece of equipment or a method available at a given time. Technology is the set of possible uses of equipment and methods plus the combinations of equipment and methods available. When only e.g. spikes exist, one may for example scrape, poke, dig and so forth, but when the hammer is invented, the set of possible uses has increased to a greater volume than just the sum of spikes alone or hammer alone would be: not only can one now also bash different things with the hammer, one can now combine pieces of material by hammering a nail through two pieces of material or hang stuff from a nail only partially nailed through a vertical surface etc. This application of technology was not available until both nails and hammers were available at the same time.

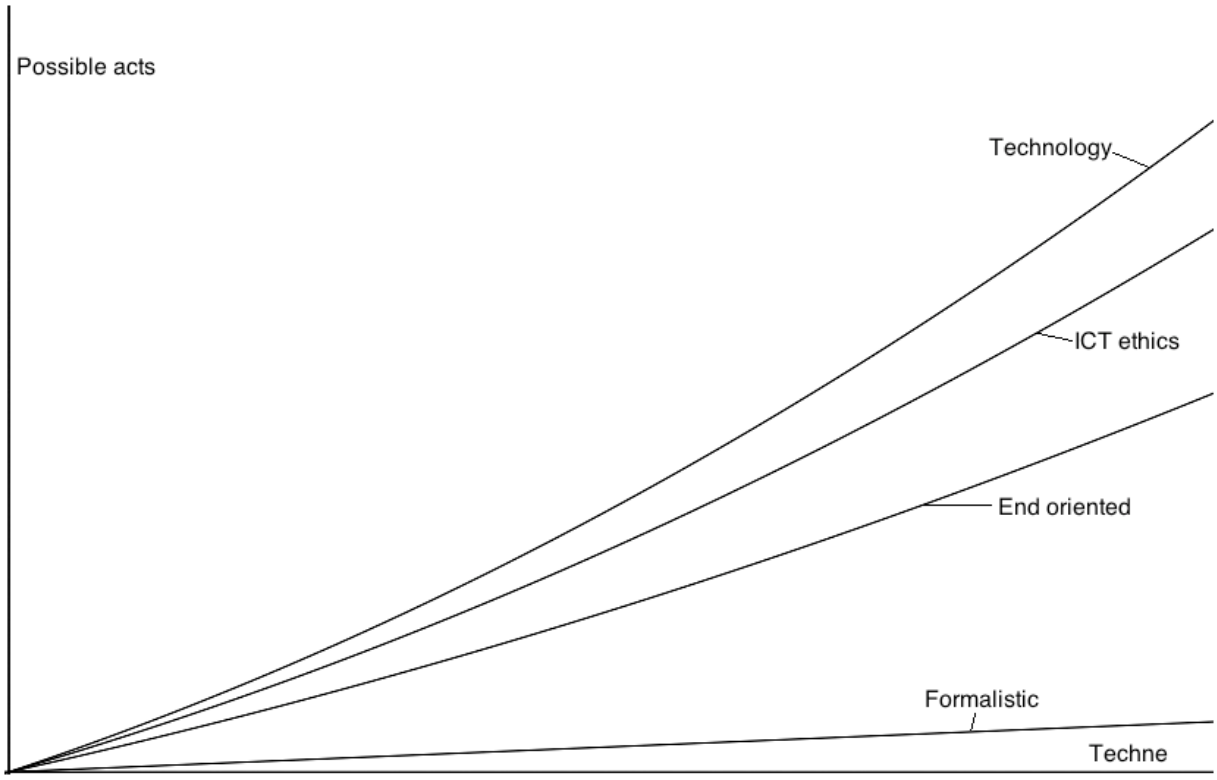

Figure 1. Moorian policy vacuum, ICT ethics, and theories of legal interpretation.

James H. Moor argued that ICT legislation will not be able to keep up with technological change, and called the gap between possibilities of technology and limits of the law a policy vacuum. (Moor 1985). In the above figure we see two curves labeled 'end oriented' and 'formalistic.' These represent two modes of legal interpretation. End oriented legal interpretation follows the development of ICT ethics and technology more closely because under that mode of interpretation the ends of the law are considered more important than the actual words used (Tamanaha 2006). Formalistic interpretation of the law uses the core meanings of words that change slowly over time (Hart 1957). Interpreting the law in the end oriented mode has been under criticism, not least because subjects would probably prefer to know what the law mandates, permits, and commands before being in court (Tamanaha 2006).

Brusiin has argued that if there is a gap in regulation, the judge must construct a legal norm from the findings of social sciences and philosophy and this construction of a norm is currently incorporated in Aarnio's doctrine of sources of law (Brusiin 1938, Aarnio 1989, Tolonen 2003). If the judge has sufficient resources and the will, the outcome might well be fair, but can we rely on everybody the law governs knowing the pertinent findings of social sciences and agreeing to e.g. which theory of ethics should be preeminent in what circumstances?

However, not everything that is regulated needs to be regulated with a parliamentary law. Decrees and guidelines are examples of regulation that is quicker to implement the a law as they do not need to pass the parliamentary legislative process. 'Soft law' is a form of regulation that is may be even more responsive to changes in circumstance (Tala

2005). In this paper we focus on the form of soft law that governs auditing as a possible model for regulating ICT.
This paper juxtaposes corporate audits on one hand and the foreman of a construction project on the other with information system develop-ment as auditing is regulated in Finland (among other jurisdictions) with a multi-level approach: an EC directive, a national law and international standard set by a body that auditors themselves have put up all co-exist and complement each other (KHT-Yhdistys – Föreningen CGR ry 2009, but auditing is oriented to records of the past, the construction foreman to the future, thus auditing alone is not a satisfactory model. As there are already ethics codes for software engineers (Gotterbarn, Miller & Rogerson 1999), the idea presents itself that such codes might be used for regulating IS development.

An ethical quandary, that of agent-principal problem in a corporation, has given rise to the insti-tution of auditing. It may be in the interests of the management to act in ways that benefit them as individuals instead of maximising the long-term value of the investments placed in the corpo-ration. Auditing is widely regarded as one of the practical solutions to this problem: as the share-holders lack the resources to properly oversee the management, they hire a specialist who audits the records of the financial transactions of the corporation for bookkeeping errors or malpractice. (LTT-Tutkimus 2006)

While the International Standards on Auditing (ISA) are not purely an ethics code, the standards do offer guidelines to how an auditor ought to act in order to minimise the possibility of failure or unethical conduct. E.g. ISA 200 has a section titled 'Ethical Requirements Relating to an Au-dit of Financial Statements' (International Federation of Accountants 2009). These standards as a whole aim at minimizing errors and ensuring that all auditors conduct their audits according to an acceptable, and knowable, external standard. (KHT-Yhdistys – Föreningen CGR ry 2009).

There are obviously differences in corporate auditing and information system development: e.g. creativity in one is not a strong positive but necessary for the other, one focuses on evaluating the numerical record of what an entity has done over a period of time, the other creates technological solutions to solve problems etc.

However, certain fundamentals are similar: the party purchasing the services of the specialist often lacks the skills or qualities necessary for evaluating the performance of the specialist before, during, and after the service has been rendered: only if problems later appear will the buyer become aware of problems in the process. These problems may be impossible to remedy by the buyer: the money that is missing from the company accounts does not re-appear nor will the criminal charges for failure to correctly maintain the company accounts disappear just because the auditor has been negligent, the information system that lacks vital features may be impossible to fix without excessive re-coding and, in the case of black box systems, may be entirely impossible without the developer's co-operation.

Furthermore, in the time period preceding the rendering of service, the buyer does not know whether the specialist will, in fact, perform with sufficient care. In the case of the auditor, the buyer can rely on auditing code, auditing standards, and auditing practices

which will provide an objective standard for sufficient care if an action for recovery of damages should become necessary.

While soft law regulation, especially self-regulation, may be easily criticized on basis that, e.g. self-regulation tends to be self-serving and is really only an attempt at staving off state regulation or that regulation that makes life more difficult for an industry will never be made via self-regulation or that self-regulation is a undemocratic and thus anathema to a democratic society, the fact is that information system projects fail and regulation that would force information system projects has failed to materialize.

The international auditing standards contain provisions that set the bar for sufficient care relatively high, even though failing to conform to standards may lead to liability for the auditor. The benefit from stringent standards is trust: as can be seen from the very well-publicized demise of Arthur Andersen auditing company, losing the trust of the clientele is fatal for an auditor.

This prompts the question: why is it that information system providers can afford to act in ways that should build mistrust in their ability to deliver? One possible answer is that there is nothing better in the market: if all the information system providers fail equally, then having a reputation for failure does not matter. This paper will next take a look at failing to deliver.

3. Problematic Information system development

Because the field of information systems development is not easy to define it is not feasible to create such a code like ISA for information system development — or at least the code would be enormous and too large to be usable by actual people. information system development is a broad field and in contrast to auditing, the goals of the pro-jects can vary considerably. Information system development is a socio-technical and humanistic (Nurminen 1988) environment where erecting strict boundaries and rigid rules that mirror those of audit regulations would be problematic because of the inherent differences between auditing and information system development.
Nevertheless, as it is a commonly occurring phenomenon that development projects of information systems exceed budgetary and time limits it is time to try alternative ways of dealing with these problems. On organizational level the problems of information systems seem to have various reasons. Ropponen and Lyytinen (2000) delineated six factors (scheduling and timing risks, system functionality risks, subcontracting risks, requirement management, resource usage and performance risks risks, and personnel management risks) of software development risks which seem to be problem over decade after(see e.g.Lee, Keil, & Kasi 2012;Nixon, Harrington, & Parker 2012 ;Strong & Volkoff, 2010)

It is obvious that even though different ways and methods for avoiding aforementioned problems exist, the actual implementation at the organizational level seems to be failing time after time. The reason for that could be that there is no actor who could be seen as responsible for the success of the project as a whole. Figure 2 presents a very simplified structure of an information system development project and actors usually involved in

it.should be noted that four major parties; management, buyer's project team, information system development provider team, and administrator(s)of the development project are acting in different phases of the project not forgetting the end users who are supposed to use the system after implementation.

Before the actual launch of a project the (top)management makes decisions whether there even will be a project or not. Usually, the decision of getting a system the buyer's project team is gathered and a project manager is hired only after management has been made. This is the first part where the overall picture and control is lost in a project. The actor who(management) decided to start the project gives responsibility to project manager who in many cases has not been able to make decisions regarding the project or influence the project goals.

Those project managers and members of the team are commonly changing during projects which again fades overall control and understanding of the project state and risks. To make this issue even more challenging, development team which does the actual coding work is often outsourced. If the project ends with the actual use of the system the everyday consequences fall on the system's administrator's lap and that of the end users(who hardly has anything to do with the project itself). Whom to blame?

If we focus on individuals - such as software engineers or programmers - in development projects, we have to ask what are their possibilities to ensure that everything goes as planned and that those plans are reasonable, maybe even achievable. If there is no one controlling the whole project with undeniable authority, there cannot be anyone held responsible. In such situation it is impossible to expect that development would fulfill the ethical codes for developing information systems when even the getting project to end without total failure is actually a glorious victory.

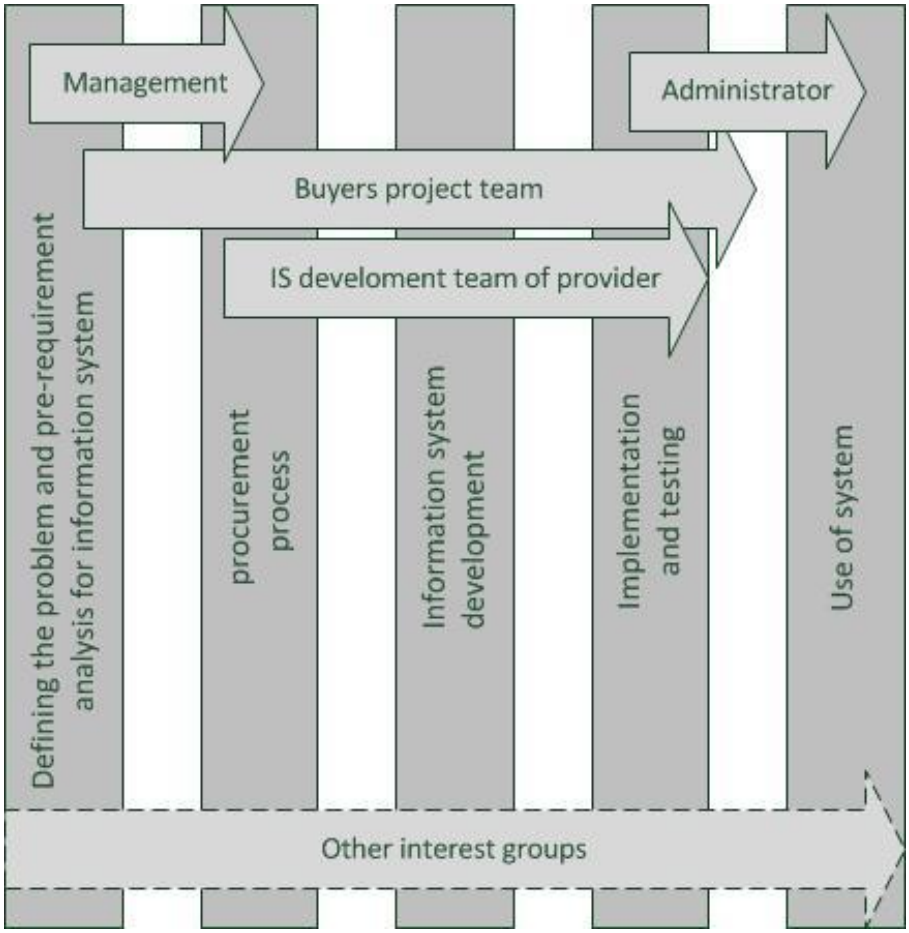

Figure 2. Simplified process description and action phases of different actors.

Keeping in mind the arguments from Gotterbarn and others that some of the problems experienced in information systems projects would be ameliorated if an ethical code were followed, and the role of auditing codes ensuring auditors pay attention to working carefully to avoid breaking the trust placed in them (and thus keeping themselves in the business of auditing) the problems of information system prompt a question: can something be done to ensure a closer adherence to the ethical codes of information system? Is there a regulatory approach that would reduce the costs and opportunity costs of following an ethics code? Alternatively, can disregarding an ethics code be made more costly?

This paper will next propose a model that would solve some of the problems present in the current fragmentation of control and responsibility, that of appointing a foreman who is expected to be familiar with an ethics code and bears a responsibility and liability for the shortcomings of the project.

4. Foreman and code of IT-ethics

4.1 How ethics codes impacts contractual liability

When a buyer agrees to buy and a seller agrees to sell something, they have the contractual obligations to sell what they agreed to sell and pay the price they agreed to pay. When an information systems project fails to meet the goals explicated in the contract, the seller has not performed their contractual obligations or the buyer is not been able to define the actual needs for the system in requirement specification. While many commercial contracts will have detailed provisions for indemnity, it is not impossible that the provisions do not cover the circumstances in which the parties find themselves.

Because the usefulness of any kind of adjudication requires that the organ making the adjudication must make a decision, i.e. they may not decide to not decide, there needs to be something on which the adjudicating organ can base their decision for the adjudication to have any legitimacy. In practice, this means that if the issue is 'did the information system provider take sufficient precautions against the impediment,' since there is no standard of care for information system providers in CISG - most sale of goods codes, one suspects - the adjudicating organ will have to use such standards as exist to establish whether what was done met the standard of reasonable. In the case of information systems projects this standard can well be an ethics code approved by an important body of information system developers, because that is what there is, and it is infinitely more applicable than, e.g., an audit code or a medical ethics code.

Thus, seller liability may even currently be impacted by an ethics code, since that is self-regulation by the software engineers themselves, who know best how information system design should be done. Having one such code given institutional support would make it easier for the sellers to know to which standard they must be careful and how to document that care. One direct consequence of this would be that buyers would know how the sellers would act out of pure self-interest, and, this paper argues, this would also result in fewer IS project failures.

One of the problems outlined in chapter 3 is that responsibility and control of information systems projects is fragmented. Can the responsibility and power to oversee be concentrated to bring about more clarity and a better rate of success? This paper will next present one possible model for solving the issues of fragmentation and opacity.

4.2 How the information systems foreman can help overcome ethical problems and liability issues

In an attempt to duplicate the relative regulatory success of auditing, we argue that information system projects ought to have a third party appointed by the buyer to oversee certain aspects of the project. This specialist would be appoint before the decision to purchase a new information system to the system's implementation. Inspiration is also drawn from construction, where, in Finland, a foreman is appointed before the building permit is applied for, and the foreman ensures that the construction conforms to both the plans and the regulations and has the obligation to cease project if project goals are not possible to meet, there is danger of personal injury, or regulations are not conformed to.

Instead of 'information system auditor' this paper uses henceforth the word 'information system foreman' and 'ISF' because auditors by definition look at records of past events, while foremen are responsible and liable for turning the construction plans to a building.

The accreditation process for information system foremen would be such that they would know the ethical code and central methodologies of information system-field. information system foremen would have commonly known status like the auditor who is responsible for the audit process. The benefits attained from institutional support to an ethics code seem worth at least some costs. Firstly, the buyers of information system would have additional guarantee of the quality of the development process. Secondly, the impact of information system on third parties would credibly be regarded in more depth than is currently the case. Thirdly, if the legal importance of being careful is made explicit, computing practitioners might well develop the habit of producing better products, ben-efiting not only customers and third parties, but also reducing liabilities.

To give an example of possible work process a comparison to an auditor's 'working papers' is illuminating: ISA standard 230 regulates the audit documentation that an auditor must create during the audit process. In paragraph 2, the standard states that the documentation provides 'Evidence of the auditor's basis for a conclusion about the achievement of the overall objectives of the auditor.' (International Federation of Accountants 2009 b) If the issue of negligence is brought up, the auditor can use the audit documentation to show what they did and why and may thus limit their liability or be exempt altogether.

The crucial difference between the conventional documentation of projects and an auditor's audit document is that an auditor is external to the company they are auditing while project documentation is issued by the information systems provider. An auditor is trustworthy because they are external, not internal. information system foremen would likewise be in the buyer's employ, and their documentation would thus be more useful to the buyer.

One important detail is that, similarly to an auditor, an information system foreman would have access to detailed and sometimes confidential information of the target of their activities. Strong confidentiality rules would be necessary to have any buy-in by the providers. This paper cannot go into the details of how exactly the rules would be created, but given that this obstacle has been, to an extent, been overcome within the institution of auditing, it does not seem impossible to overcome it within information system projects.

As regards the liability of an information system foreman, the extent of liability should probably be very limited because the damages may reach vast amounts. A complete lack of liability would, on the other hand, incentivise taking on too many projects at once. ISF liability is an issue that requires further research, possibly utilising a law and economics approach.

5. Conclusions

As outlined in this paper, information system projects fail to meet their stated goals quite often because of variable reasons. The ethics codes of developing information system that currently exist have not been sufficient to bring about design processes that would, over time, lead to less failures. On the other hand, these ethics codes impact the liability of the provider because they can be used as an objective standard of reasonable precautions for impediments.

This paper argues that information system projects would succeed more often if a specialist was appointed to oversee the entire project. The specialist's position could have similarities to the position of an auditor or a construction project's foreman. The costs remain unknown, but the benefits would include a higher chance of meeting the project goals and less negative externalities. Further research seems necessary on the interaction of the position of an information system foreman with contract law and in the law and economics workings of such a model.

References

Aarnio, Aulis (1989)Laintulkinnan teoria. Juva.

Brusiin, Otto (1938) Tuomarin harkinta normin puuttuessa. Vammala

Hart, Herbert (1957) L. A.: Positivism and the Separation of Law and Morals. Harvard Law Review (1957), vol. 71, pp. 593-692.

Gotterbarn, D. (2001), Informatics and Professional Responsibility. Science and Engineering Ethics, 7, 221-230.

Gotterbarn, D. (1999), How the New Software Engineering Code of Ethics Affects You. Software,16(6), 58-64.

Gotterbarn, D., Miller, K. & Rogerson, S. (1999), Software Engineering Code of Ethics Is Ap-proved. Communications of the ACM. 42(10), 102-107.

International Federation of Accountants (2009). ISA 200 http://www.ifac.org/sites/default/files/downloads/a008-2010-iaasb-handbook-isa-200.pdf Read on Apr 5, 2014.

International Federation of Accountants (2009b). ISA 230 http://www.ifac.org/sites/default/files/downloads/a011-2010-iaasb-handbook-isa-230.pdf Read on Apr 5, 2014

KHT-Yhdistys – Föreningen CGR ry (2009), Tilintarkastusalan standardit ja suositukset 2009. KHT-Media LTD. Helsinki 2009.

Lee, J., Keil, M., & Kasi, V. (2012). The Effect of an Initial Budget and Schedule Goal on Software Project Escalation. J. Manage. Inf. Syst., 29(1), 53-78.

LTT-Tutkimus Oy (2006), Tilintarkastusvelvollisuuden uudistamisen taloudelliset vaikutukset. Kauppa- ja teollisuusministeriö rahoitetut tutkimukset 2/2006. Edita Publishing LTD. Helsinki 2006.

Nixon, P., Harrington, M., & Parker, D. (2012). Leadership performance is significant to project success or failure: a critical analysis. International Journal of Productivity and Performance Management, 61(2), pp.204-216.

Nurminen, M. (1988) People or Computers: Three Ways of Looking at Information Systems. Bromley: Studentlitteratur, Chartwell-Bratt. Lund.

Tala, Jyrki(2005) Lakien laadinta ja vaikutukset. Helsinki.

Tamanaha, Bruce Z. (2006). How an Instrumental View of Law Corrodes the Rule of Law. DePaul Law Review, 56, 469-506.

Tolonen, Hannu (2003).Oikeuslähdeoppi. Vantaa.

Strong, D. M., & Volkoff, O. (2010). Understanding organization--enterprise system fit: a path to theorizing the information technology artifact. MIS Quarterly, 34(4), 731-756.

United Nations Convention on Contracts for the International Sale of Goods (CISG)

Ziman, J. (2001), Getting Scientists to Think About What They Are Doing. Science and Engi-neering Ethics, 7, 165-176.