Continuous Auditing

Philip Elsas

Continuous Auditing

Limperg Instituut

Key concepts

- Auditing in a close to real-time setting
- Owner-ordered auditing
- Management-ordered auditing
- Integrated example: franchise industry
- Nexus micro-macro

29 mei 2013 Symposium Statistical Auditing

vrije Universiteit amsterdam

Continuous Auditing

Agenda

- Limperg operationeel
- Starreveld online
- Frielink's audit equations
- Blokdijk's onvervangbare interne controle
- Veenstra's waardesprong

29 mei 2013 Symposium Statistical Auditing

vrije Universiteit   amsterdam

Limperg operationeel

- Limperg: van filosofisch naar operationeel

- Nexus micro - macro
  - up: micro naar macro
  - down: macro naar micro

- Rationele verwachtingen & transparantie
  - niet te hoog
  - niet te laag

29 mei 2013 Symposium Statistical Auditing

vrije Universiteit *amsterdam*

Limperg operationeel

"Thus, the most important factor is society's needs, and the related factor that interacts with it is the ability of audit methods to meet society's needs.

*However, society's needs are not fixed and change over time.*

Also, auditing methods can change and improve over time",

Douglas Carmichael, bringing in Limperg's ideas as blueprint for the PCAOB, where he served as first & founding chief auditor (Accounting Horizons, 2004)

vrije Universiteit   amsterdam

Owner-ordered & Management-ordered Auditing

29 mei 2013 Symposium Statistical Auditing
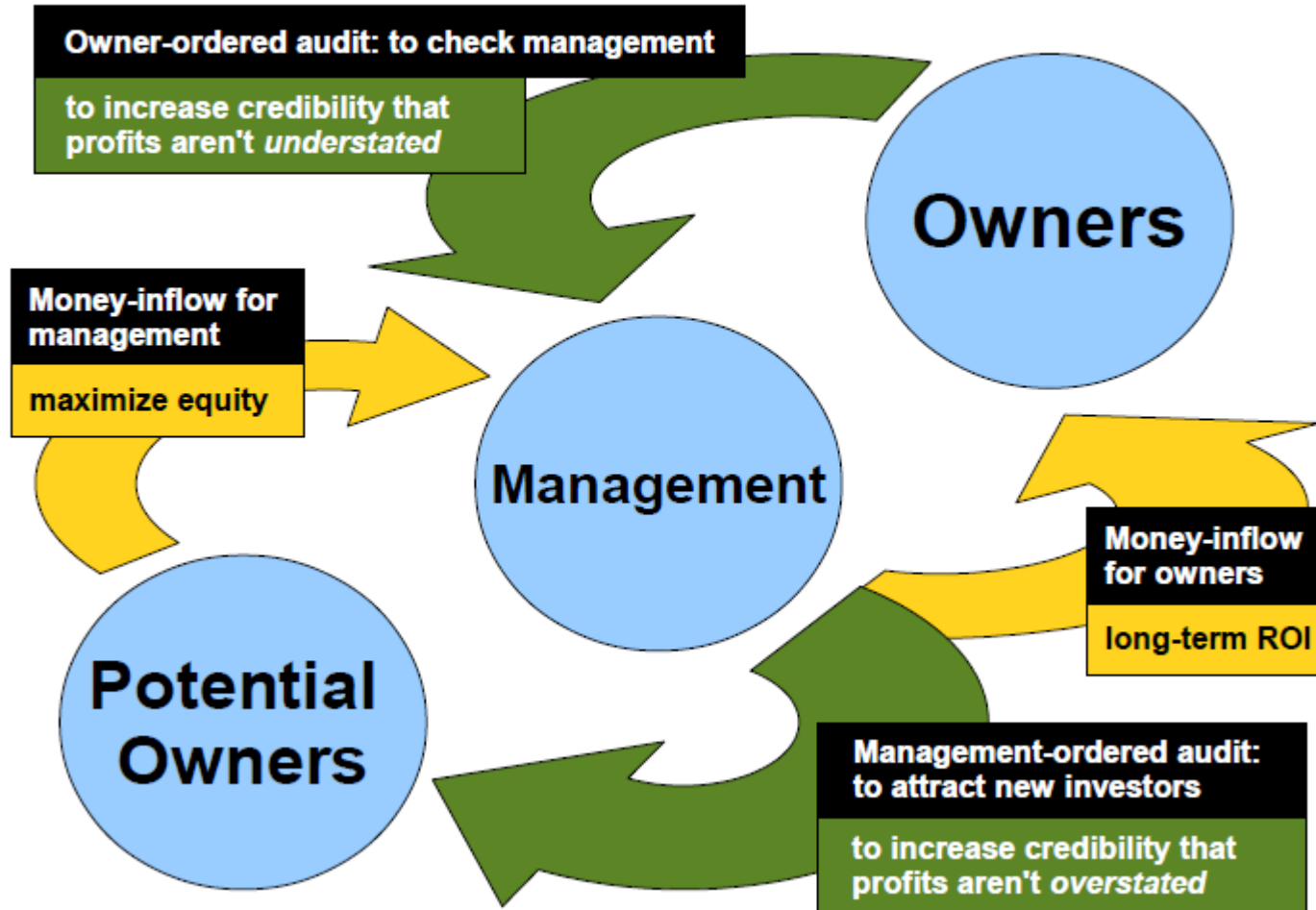
Limperg operationeel

- Owner-ordered auditing addresses <u>understatement of profits</u>: whether revenues are understated and expenses are overstated
  As an owner you want assurance that management, who you entrusted your money, is not making profits while keeping parts of it unstated, since profits are the basis of your dividends and stock quotation

- Management-ordered auditing addresses <u>overstatement of profits</u>
  As management you want to attract investment capital by increasing your credibility that the profits you state are all real, not overstated, and so you hire the independent auditor to provide this assurance

- Management's illegitimate interest – overstating or understating profits – determines the direction of the audit from a market-driven value-adding perspective

29 mei 2013 Symposium Statistical Auditing

vrije Universiteit   *amsterdam*

Limperg operationeel

"Investors have reduced their time horizons; with owners all but gone, there's no countervailing leadership.

Twenty-five years ago, the average holding time for a stock was seven years; now it's seven months.

In today's market, 80% of daily trades are made by investors who hold the stock less than seven seconds.

The guy who holds your stock for seven seconds doesn't care about your strategy, much less sustainability."

Charles Sirois, The Ownership Imperative, Listed, 2012

vrije Universiteit   amsterdam

Limperg operationeel

- Internal Revenue Service: franchise project, close-to-real-time completeness for the one at the receiving end of royalties, in broad sense, including taxes

- Anticipating systemic risk while it's building up (micro to macro), and reversing it, or at least halting it early on (macro to micro)

29 mei 2013 Symposium Statistical Auditing

vrije Universiteit *amsterdam*

Limperg operationeel

- Case: OTC derivatives, $700 trillion, 10 years world GDP

- Macro: Bookstaber's systemic risk indicators

  - leverage, crowding & market linkages

- Micro: FpML

  - unique id's: legal entity, product & trade

- Generic mechanism, both "up" and "down"

- Role of audit profession

29 mei 2013 Symposium Statistical Auditing

vrije Universiteit *amsterdam*

Continuous Auditing

Agenda

- Limperg operationeel
- <u>Starreveld online</u>
- Frielink's audit equations
- Blokdijk's onvervangbare interne controle
- Veenstra's waardesprong

29 mei 2013 Symposium Statistical Auditing

vrije Universiteit   amsterdam

Starreveld online

- Waardekringloop: van mentaal model naar computationeel procesmodel

- Modellenbank online, met upload & download facilities
  - scientific layer
  - practitioners layer
  - educational apps, TED Salman Khan

vrije Universiteit *amsterdam*

Integrated Owner-ordered & Management-ordered Audit Approach

Is this integrated approach somewhere recognized, proven or implemented?
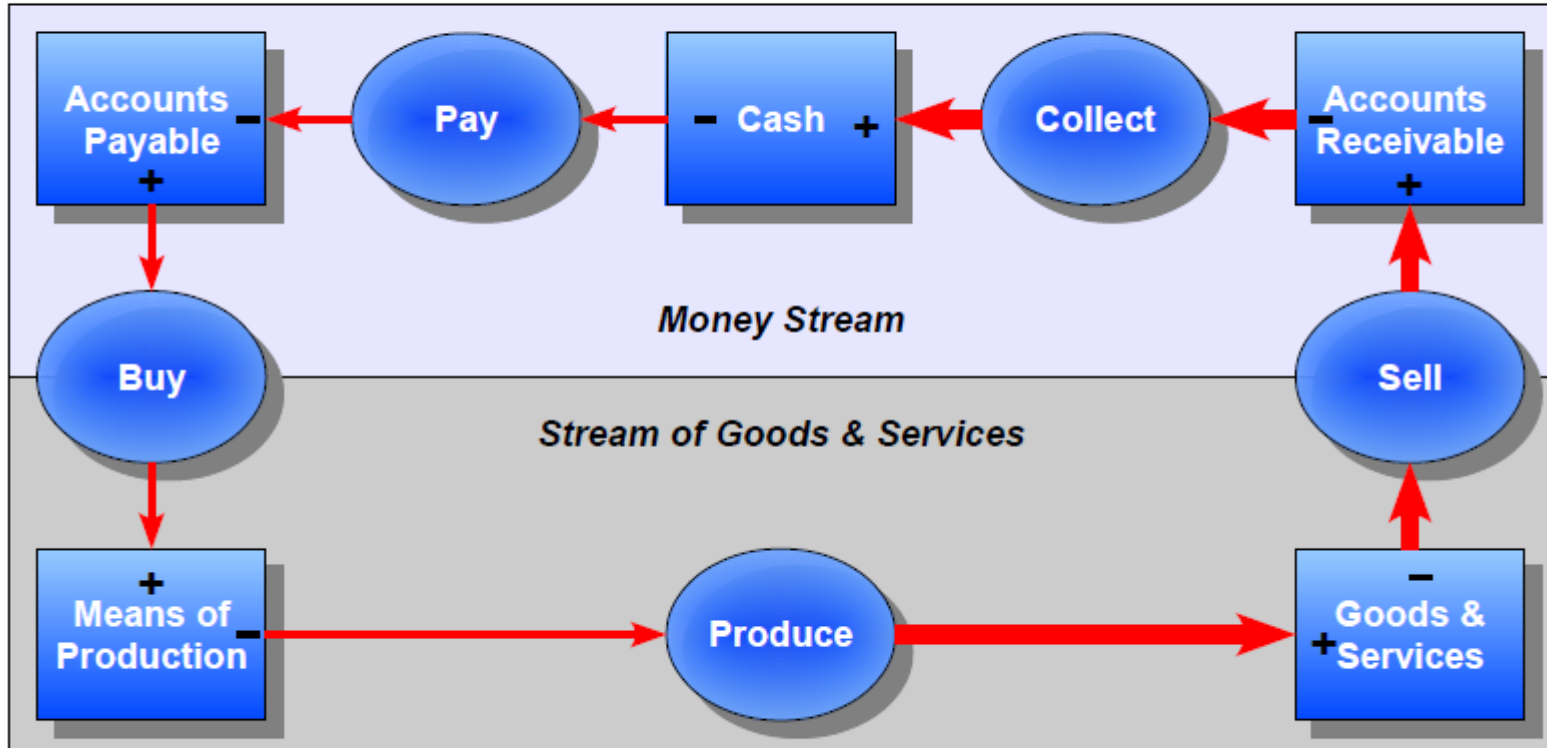
Capturing "understanding the client's business" in a top-cycle model, originated in UK & Germany, matured in Netherlands in 1930s-1990

Starreveld's typology

CLASSIFICATION				EXAMPLES
organizations producing for the market / organizations with a dominant flow of own goods	organizations without a technical transformation process	trade organizations delivering mainly to other industries		wholesalers, importers, exporters
		trade organizations delivering mainly to final consumers		shops, retailers
	industrial organizations	industrial organizations with homogeneous mass production	(flowingly) rotating homogeneous mass production	gas-works, power stations, sugar-factories, oil refineries, paper-mills
			(intermittently) parcelling homogeneous mass production	brick-works, breweries, tanneries, lime-kilns, wire-drawing mills
		industrial organizations with heterogeneous mass production	singular heterogeneous mass production	glass-works, potteries, wall-paper factories, preserving factories
			compound heterogeneous mass production	factories for: shoes, ready-made clothing, audio devices, bicycles, cars
		industrial organizations with (serial) piece production	(unique) piece production	cloth tailoring, house building contractors, shipyards, engineering works
			serial piece production	builders of: sisterships, ship motors, railroad passenger cars
	agrarian and extractive organizations			agriculture, animal husbandry, horti-culture, forestry, mining industry, fishing industry
organizations and professions without a dominant flow of own goods	service organizations	service organizations with flow of goods	some flow of goods owned by the organization	pubs, coffeehouses, restaurants, publishers of newspapers
			flow of goods owned by others	auctioneers, laundries, dye-works, repair-works, transporters, store-houses (goods)
			delivery of goods via fixed pipes or wires (is: outflow)	gas, electricity and water suppliers, telephone exploiters, radio and television broadcasters,
		service organizations offering space-time capacity	specific reservation of space-time capacity	house exploiters, hospitals, hotels, storehouses (see also above), transporters of passengers over relatively long distance (e.g. aviation, shipping)
			unspecific reservation of space-time capacity (via quasi-goods, e.g. tickets)	entertainment providers, swimming pools, theaters, transporters of passengers over relatively short distance (e.g. train, bus, taxi-cab)
		other service organizations and professions (time capacity / number of performed tasks)		professional services, cleanup services
	financial institutions	banks		general banks, savings banks, mortgage banks
		special finance institutions		venture capital companies, investment companies (trusts)
		intermediates in stock exchange		stockbrokers
		insurance organizations		life insurance and indemnity insurance companies
organizations producing (and/or offering services) directly for their members, i.e. without mediation of the market		governmental agencies and public corporate bodies (as excluded above)		government (central, provincial, municipal), public corporate bodies (possibly belonging to organizations which produce for the market)
		private corporate bodies (as excluded above)		foundations, societies, religious communities

29 mei 2013 Symposium Statistical Auditing

vrije Universiteit amsterdam

Continuous Auditing

Agenda

- Limperg operationeel
- Starreveld online
- Frielink's audit equations
- Blokdijk's onvervangbare interne controle
- Veenstra's waardesprong

29 mei 2013 Symposium Statistical Auditing

vrije Universiteit amsterdam

Frielink's equations

- Audit equations
- Audit direction per equation parameter
- Dominant direction: owner-ordered audit
- Set of equations per type of industry

vrije Universiteit   *amsterdam*

FIRST LETTER		SECOND LETTER	
A =	Articles in quantities (merchandise or finished product)	a =	delivery or depreciation
B =	Extraordinary income (i.e. not due to turnover)	b =	opening balance
C =	Creditors	c =	via creditors
D =	Debtors	e =	closing balance
F =	Financial resources	i =	purchase or cost prices
G =	Cash	o =	receipts
I =	Investments (in durable production means)	t =	attributed, allocated or imputed
K =	Sundry costs	u =	expenditures
L =	Salaries (and other labour costs)	v =	sales price
P =	Prices		(Notice, r and x are dropped here.)
T =	Value-added tax (VAT)		
V =	Raw material in quantities (including auxiliary material and half-finished articles)		
W =	Profit or gross profit		

WHOLESALE TRADING ENTERPRISE, ELEMENTARY MODEL - § 5.1.211

(7)	Debtors	$Db + Aa \times Pv + Tv - De \rightarrow Do$
(6)	Sales	$Aa \times Pi + W \rightarrow Aa \times Pv$
(3)	Articles	$Ab \times Pi + Ao \times Pi - Ae \times Pi \rightarrow Aa \times Pi$
(2)	Creditors	$Cu - Cb + Ce - Ti \rightarrow Ao \times Pi$
(1)	Cash	$Gb + Do - Tu - Ge \rightarrow Cu$
(8)	VAT	$Tb + Tv - Ti - Tu \rightarrow Te$

WHOLESALE TRADING ENTERPRISE, EXTENDED MODEL - § 5.1.303

(7)	Debtors	$Db + Aa \times Pv + Tv - De \rightarrow Do$
(6)	Sales	$Aa \times Pi + W \rightarrow Aa \times Pv$
(4)	Durable production means	$Ib + Iu + Ic - Ie \rightarrow Ia$
(3)	Articles	$Ab \times Pi + Ao \times Pi - Ae \times Pi \rightarrow Aa \times Pi$
(2)	Creditors	$Cu - Cb - Ti - Ic - Kc - Tc + Ce \rightarrow Ao \times Pi$
(1)	Cash	$Gb + Do + Fo + Bo - Iu - Ku - Lu - Tu - Fu - Ge \rightarrow Cu$
(8)	VAT	$Tb + Tv - Tu - Tc - Ti \rightarrow Te$
(9)	Financial resources	$Fu + Wu - Fb - We + Fe \rightarrow Fo$

Not included: Accruals, Deferrals, Provisions and Group company related items.

PRODUCTION ENTERPRISE MODEL - § 4.3.133

(7)	Debtors	$Db + Aa \times Pv - De \rightarrow Do$
(6)	Finished articles	$Ab \times Pi + Ao \times Pi - Ae \times Pi + W \rightarrow Aa \times Pv$
(5)	Production	$Va \times Pi + Lt + It + Kt \rightarrow Ao \times Pi$
(4)	Durable production means	$Ib + Iu + Ic - Ie \rightarrow Ia$
(3)	Raw material	$Vb \times Pi + Vo \times Pi - Ve \times Pi \rightarrow Va \times Pi$
(2)	Creditors	$Cu - Cb - Ic - Kc + Ce \rightarrow Vo \times Pi$
(1)	Cash	$Gb + Do + Bo - Iu - Ku - Lu - Ge \rightarrow Cu$

Not included: Accruals, Deferrals, Provisions, Group company related items, Value-added tax, Financial resources and position Work in progress.

Frielink's
audit equations

29 mei 2013 Symposium Statistical Auditing

vrije Universiteit   amsterdam

Continuous Auditing

Agenda

- Limperg operationeel
- Starreveld online
- Frielink's audit equations
- <u>Blokdijk's onvervangbare interne controle</u>
- Veenstra's waardesprong

29 mei 2013 Symposium Statistical Auditing

vrije Universiteit   amsterdam

Blokdijk's onvervangbare

"...The auditor analyzes the Circular Flow of Values within the enterprise, in order to find the strongest possible basis for the audit of the completeness of revenues.

The internal control of the relationships within the Circular Flow of Values is the indispensable link in the internal control chain which covers the whole chain of transactions.

Without that link, Limperg stated [...], every system of internal control and every audit is doomed to fail, because the coherence between purchases and sales, assets and liabilities could not be established.

Without that link it is impossible to ascertain that the accounts are complete."

Hans Blokdijk, Fred Drieënhuizen & Philip Wallage, 1995, p.47

vrije Universiteit amsterdam

Blokdijk's onvervangbare

How to find the missing data?

Spanning Reconciliation Checks,
Comprehensive Coherence Testing,
in Dutch: omspannende verbandscontrole

How to take care that missing data can be found?

Coverage of logging locations in Segr. of Duties over full top cycle: waar zitten momenten van 1ste vastlegging + indien nodig, aanvullende controls, in Dutch: onvervangbare interne controle

Blokdijk's onvervangbare

'Non-reproducible' internal controls (Blokdijk, 2010, SIKS)

So, there are internal controls that cannot be reproduced by the auditor. The issues raised by this circumstance have been explored extensively in Dutch auditing literature. The best English translation I have been able to find for this type of internal controls is: 'non-reproducible' internal controls (in Dutch: "onvervangbare interne controle").

29 mei 2013 Symposium Statistical Auditing

vrije Universiteit *amsterdam*

Blokdijk's onvervangbare

'Non-reproducible' internal controls (Blokdijk, 2010, SIKS)

Even though there are internal controls that can be reproduced, such as those involving arithmetical operations, the most important ones often cannot be reproduced. The fundamental causes have been categorized as follows:

(1) expertise: the auditor cannot possibly acquire sufficient expertise to form, entirely by himself, a conclusive opinion on all the technical and/or commercial events that are to be reflected in the financial statements (e.g., product yield rates, purchase prices);

(2) presence: the auditor cannot possibly be continuously present on the client's premises in order to ensure the completeness of the recording of transactions and (relevant) events; apart from economic considerations, this is unacceptable in that it would jeopardize the client's and/or the auditor's independence; and

(3) inadmissibility of investigative techniques: the independent auditor is not entitled to use certain techniques that are available to government auditors (such as informing other government auditors about other taxpayers), or that may be used by police authorities (such as wiretaps, search of private premises and the like).

29 mei 2013 Symposium Statistical Auditing

vrije Universiteit *amsterdam*

Blokdijk's onvervangbare

So what should external auditors do about 'the system of internal control'? Firstly, they should evaluate the design of the system. Especially important is the segregation of duties; e.g., no single person should be able to authorize payment of invoices, and persons charged with the authorization of separate elements (quantity, quality, prices) of invoices should not have an interest in collusion with each other, or with suppliers or other parties outside the auditee.

(Blokdijk, 2010, SIKS)

Top-cycle process computation: maximize size of minimally required collusions that can tracelessly defraud the enterprise.

vrije Universiteit   amsterdam

Continuous Auditing

Agenda

- Limperg operationeel
- Starreveld online
- Frielink's audit equations
- Blokdijk's onvervangbare interne controle
- <u>Veenstra's waardesprong</u>

29 mei 2013 Symposium Statistical Auditing

vrije Universiteit   amsterdam

Veenstra's waardesprong

- Introductie waardesprong bij Starreveld (1968)
- Procesinvariant van de goederenbeweging
  – "buy side to sell side" BETA equation –
  eerst vaststellen in goederen en dan in geld,
  via kostprijs, verkoopprijs en waardesprong,
  om omspannende verband rond te krijgen
- Goederen gemeten in Units of Measurement
- Paul Griffioen's dissertatie

29 mei 2013 Symposium Statistical Auditing

vrije Universiteit   amsterdam

Continuous Auditing

Agenda

- Limperg operationeel
- Starreveld online
- Frielink's audit equations
- Blokdijk's onvervangbare interne controle
- Veenstra's waardesprong

+ announcement, next page

29 mei 2013 Symposium Statistical Auditing

vrije Universiteit *amsterdam*

SIKS/ACL
Owner-ordered Auditing Symposium

met: Limperg operationeel, Starreveld online, ...

key note:
NL Belastingdienst franchise project

Gatineau, Québec, Canada

September 27-28, 2013

29 mei 2013 Symposium Statistical Auditing