Building Synergies between Theory and Practice
Countering Financial Crime on a Systemic Approach

Ambitions and hurdles in the fight to Financial Crime

According to one old anecdote, one day at the end of 18th century, in a Primary School in the Duchy of Brunswick (now Germany), a teacher – possibly wanting to go after some business of his for a while – gave the pupils a very stupid but time-consuming task. He asked them to sum up the first 100 numbers, adding 1 to 2, the result to 3, the new result to 4, and so on up to 100.

Within a few minutes a young boy was at the teacher’s desk with the right solution – exactly five thousand fifty.

“How did you get that?” – asked the teacher between irritated and astonished.

“I noticed – was the answer – that 1 plus 100 sums up to 101. Then 2 plus 99 sums up to 101 again, and so do 3 plus 98, 4 plus 97, 5 plus 96, and so on until 50 plus 51, which is still 101. So your sum is just 50 times 101.”

The young boy was Carl Friederich Gauss.

A less anecdotal story, which may be also relevant to quote here, is the so-called “Koenigsberg Bridges Puzzle”.

As it seems, the town of Koenigsberg (now Kaliningrad) was built on the banks of a river, including an island in the centre. Seven bridges, according to the map, connect the banks and the island.

Massimo Nardo is Deputy Head of the Statistical Financial Analysis Unit in the Anti-money-laundering Department of Ufficio Italiano dei Cambi (Italy’s Financial Intelligence Unit). The views and opinions expressed in this paper are those of the author and don’t necessarily reflect the position of Ufficio Italiano dei Cambi.
The Puzzle goes as follows. You are invited to find out a path that goes across all the seven bridges, passing by every single bridge just once, and ending in the same place from where you started.

People are usually led to start trying to solve the problem by a trial-and-error process. They may then go on for hours, days, months or more, depending on their determination and stubbornness, without success.

Another 18th Century great mathematician, Leonhard Euler, demonstrated such impossibility in theory, by a specific analytical reasoning\(^1\). Its core argument lies in considering that one is required to carry out an even number of shifts (to and fro’ from one bank to the other, or from one bank to the island, or from the island to one bank) through an odd number of passages. Such a ground for doubt might probably arise also in the mind of a not particularly learned man who tried to approach the problem in more theoretical terms.

These stories have a common message. Appropriate theory can lead to prompter and more effective action (like in the example of Gauss), or prevent from wasting time and resources in trying to achieve empirically something we can never attain (like in the example of Koenigsberg Bridges). This is a lesson we must not forget. Unlike intense enthusiasts of ready, direct, (hopefully) effective action may claim, theory is no resources waste.

Indeed, the more complex the goal, the more useful is a valid theoretic approach, and particularly in the field of Financial Crime the contribution that theory and proper methodology can offer to effective action is essential.

Speaking of financial crime in general is not by chance. It is not only that financial crime is a category which can generically encompass many others, like money laundering or terrorism financing or corruption or fraud. It is that it’s becoming clearer and clearer over time that all these types show a certain degree of correspondence, are in a significant measure interrelated and often connected in a wider common framework.

The fight against financial crime encounters many difficulties. It takes place on a global battle space, in an extremely complex, sophisticated, worldwide spread, high technological environment. It faces a kind of enemies who are extremely mobile and unpredictable, able to adapt their strategies easily and readily, exploiting alternative channels and solutions as soon as prior means and routes are identified and put under control.

\(^1\) See [http://mathforum.org/isaac/problems/bridges2.html](http://mathforum.org/isaac/problems/bridges2.html).
Indeed, what the Community’s expectations (let alone, sometimes, the Law itself) ask from Enforcement and Investigations Agencies in the field of countering financial crime, requires a kind of knowledge which no existing discipline provides ready-made. Institutions and individuals who have the responsibility of such results have to work out their ways on their own.

Therefore, in no field like in matter of countering financial crime theory, methodology and research are essential implicit pre-requirements for action, since only theory, methodology and research can foster better effective and efficient results.

**An example**

An example of the potential for applications coming from a proper methodological approach can be offered by “Spotlight Project”.

“Spotlight” is a research project, which Ufficio Italiano dei Cambi (the Italian FIU) has been carrying out in association with the London School of Economics and a number of European enforcers, regulators and financial institutions pooled under EC aegis. It aims (among other) at exploring the possibility of, and the conditions for, developing a “Behaviour Pattern Approach” – an approach that aims at mapping behaviours associated with money laundering and at expressing the resultant maps as possible IT assisted targeting models. The approach’s goal is describing, constructing and if possible simulating a behaviour appearing “suspect” per se, and whose characteristics we can capture by data-screening processes.

The Behaviour Modelling Approach brings together both theoretic knowledge (the findings of scientific disciplines and of academic research) and operational knowledge (the experience and expertise of financial professional activity as well as of criminal and civil investigation) in a building process centred upon a three-step sequence:

- **Description** – portraying the characteristics of the behaviour with no concern about capturing them by data-screening processes. Description can be drawn from sources, which are external to the building process, or be developed a part of the process itself. According to the case, Spotlight methodology assesses the quality of the external description, or assists its production within the Building Process.

- **Parameterisation** – translating the description into mathematical terms with the purpose of facilitating automation. A Descriptive Model has, in itself, no potential for heuristic application, and can be directly used by the members of Enforcement Agencies or Prosecutors to spot other cases similar behaviours. This kind of activity maybe anyway performed exclusively by human agents, since only a human mind can recognise similarities between a descriptive abstract model and a specific occurrence.

Yet, the key to a practical exploitation of the knowledge gathered by the different approaches lies in connecting the models to the real financial activity – actually, to the data that reflect it. To do that, information and behavioural models developed and expressed in descriptive terms must be made concretely applicable and comparable

2 E.g., in Italy Law 197/1991 states that the Ufficio Italiano dei Cambi “shall, for the purpose of bringing to light possible occurrences of money laundering in given geographical areas, put into effect statistical analyses of the aggregated data relating to the operations of each authorised intermediary”. Neither the Law, nor Statistics alone, nor whatever other existing discipline provide full indication about how such a target can be achieved, and successful action relies on proper grounded, continuous, innovative research.

3 See [http://isig.lse.ac.uk/research](http://isig.lse.ac.uk/research).
with such data. Hence, a need to translate descriptive standards which define certain behaviour in algorithms and parameters that enable “queries” to emerge. The parameterisation module refers to the translation of the descriptive module in such a way that we can measure it and capture these characteristics by data-screening processes.

- Querying – applying the parameters to existing data archives and consequently processing the data themselves. This stage is aimed at obtaining “knowledge” from the data available, and refers to the application of the parameters, which have been developed in the parameters module, to the specific existing data archives.

The whole process of Model Building rests on the appropriate design of the path that goes from choosing the elements to describe the behaviour, to identifying the better parameters to reflect them, and finally to setting out proper queries that match parameters within the available data. Such design must be logic and rationally grounded, reasonable in its basis as well as in its development, and sheltered from the risks coming from unsound basic assumptions, erroneous process or distortions, which can hamper the path and produce unreliable results.

To this purpose, a proper methodology\(^4\) must assist and assess every one of the several components and steps of the process. Moreover, methodology must assist properly the correct implementation of each phase (see chart).

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**Complexity and the Conditions for Acting upon a System**

This is, anyway, just an example. Essential contribution can come from research on a much wider scale.

If we want to act in a system – and especially in such a complex and delicate system as the financial market – we have to develop a systemic cognitive framework and a systemic approach.

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\(^4\) Such methodology has been developed in the course of the Research, and the results will be made available to the maximum extent that confidentiality allows in LSE Spotlight Website.
It is a capital finding of Cybernetics that if we want to find out a solution in a system of many variables, we must have a number of computations equal to the number of variables we want to consider\(^5\).

Transferred to modelling in a systemic approach, this means that if we want to intervene by action in a complex system, we need to define, explore and reconstruct this system at least at the level (of complexity) we want to intervene.

Additionally, once we want to intervene in a System, we must be aware that the System will spontaneously react rearranging its internal structure and procedures, and take this reaction into account\(^6\).

In other words, we have to work out in advance what reaction the action we are planning to implement will produce in the system – in its whole as well as in its relevant components. We have then to evaluate our action not simply according to our goals, or according to the immediate effects we aspect it may produce, but according to the acceptability of the reaction we may expect from the system. Should this reaction appear unacceptable, but we feel we need to implement our action anyway, we must extend our planning to proper second-level action, able to confront such unwelcome reaction. And we have to assess also this second-level action in systemic terms, that is in terms of subsequent (acceptable) second-level reaction from the system. And so on and on, as every good cheque player might explain.

For instance, if we decide to put a new industrial category under strict anti-money laundering controls, we may expect that financial criminals (they themselves, in a way, part of the system) will look for alternative, less controlled channels. We may also expect that controlling such alternative channels might prove more costly and less effective as compared to those, which have already been submitted to control. Therefore, we shall be in condition of anticipating what alternative channel(s) is most likely that financial criminals will chose. And we shall devise in advance adequately effective and acceptable controls to be put in place quickly on such alternative channel(s) when we start introducing controls on our target category.

This is why it is essential to be accurately aware of the structure of the system.

Illicit finance is finance nevertheless – subject to the same basic functional rules. It is always a matter of finding out and exploring opportunities existing in the environment, at bearable cost, in order to achieve one’s goals and profit.

Therefore, if we want to combat effectively financial crime, it is crucial that we know what instruments and opportunities the system may offer to those who are to act within.

\(^{5}\) Requisite Variety Principle or “Ashby’s Law”: “The larger the variety of actions available to a control system, the larger the variety of perturbations it is able to compensate” – ASHBY, W. R. - *An Introduction to Cybernetics* – 1957, Cpt 11.

Mapping the System

This means that financial criminals will tend to explore and exploit the whole grid of opportunities each system can offer. In fact, a “globalised” context characterises most of the contemporary economy. In this context, given the “openness” of liberal systems and the ease of communications, any operational innovation looks admissible and legitimate in principle; and can escape – at least in some parts of the system – the controls and constraints that may be put in place in other parts.

So it is for money-laundering. In the placement phase money-launderers will look for feeblepoints at the level of local system; in the layering phase they will look for feeblepoints at global level. Their goal will be to spot what systems (or what combination of passages among different systems) can offer the best chances.

Same it is for financial crime of other sort. It is reasonable to think that illicit financial flows and activities look for favourable environments where opportunities and loopholes can benefit their goals and help disguising the track of criminal activity outcomes or proceeds, sharing similar sets of path, of instruments, and maybe of schemes.

But in every case the money trail will probably verge to key-passages and crucial gates, which are situated in areas or pivotal centres offering major “shade”, or are concealed or nested within apparently fair business, in order to avoid being spotted and intercepted by enforcement agencies.

In other words, we can conceive of money-laundering and financial crime of other sort as of “open” activities, basically centred on the search of feeblepoints in the system.

So, the need to counter financial crime is bound to confront with both a technological and a legal dimension. The first one, to assess what can be really done, and how, in a world where often what is feasible changes from day to day. The second, to define not only what has to be regulated, and how, but also under which conditions or limits this is possible, in order to permit co-ordination, standardisation and co-operation at international level.

Traceability aims at three different and progressive goals. First, the matter is finding out a relevant track and follow it, in order to discover who the culprit is. The second goal is reacting – that is, getting hold of the culprit in order to punish him/her. Finally, there is the need of anticipating his/her further action, in order to prevent him/her from further damage. Effectiveness requires that all the three goals be reached quickly. By contrast, experience shows that each of them requires increasing time and efforts as compared to the previous one, and is increasingly difficult to achieve.

The fight against financial crime is frequently portrayed as a shelter of market integrity. Now, a surveillance activity aiming at markets integrity either will be proactive, or won’t be.

Supervising a free market means conditioning its routes, so as to oppose the ones which show higher potential for illicit action, and to encourage those which can produce better law-abiding behaviours, higher transparency and greater information symmetry.

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To do so we need to work out monitoring instruments to be used to predict/intercept crooks’ possible action: identifying structural links and connections, risk areas and phenomena, loopholes through which constraints can potentially be avoided or breached, with low cost and low risk of punishment; discovering connecting nodes and access points that are not sufficiently guarded, or gaps by which constraints can potentially be got around at low cost and low risk of getting caught.

This will allow mapping possible routes, margins and costs of accessibility for perpetrating illegal operations, so as to integrate knowledge and action for the goals we’re after. Like a hunter who knows the landscape his prey can move through can predict where it is going to make for, and chase it there, and once he’s spotted it he can have the other hunters converging there, in order to catch hold of it.

In this regard, the possibility of drawing up a model of the system and the behaviours within it may prove particularly useful. Particularly, it can make it possible to “map” the spread of certain characteristics, structural links and connections, risk areas and phenomena and to identify the behaviour patterns to focus attention on. In this way, changes in behaviour could be anticipated for new constraints and opportunities and well-focused action could be taken.

Indeed, we need to know more about the movements that go through the markets: the causes, options, instruments available, the opportunities that arise from all these, the choices that this mix can offer the perpetrators, and the effects these choices produce at system level. We must be able to foresee, anticipate and influence changes in behaviour – not only those of lawful operators, but if possible those of the same illegal players.8

A better-structured knowledge could also provide better support to decision-making, and to the design of supervisory strategies. Spotted loopholes would cast light on targets to be addressed and removed. Connecting nodes and access points would reveal suitable spots for new efficient controls to be placed. The whole system would benefit from promoting and sharing knowledge of such kind.

Research can help to answer these questions, both in developing/gathering knowledge and in integrating knowledge into action. This need for qualified, practical-fitting knowledge is the widest field of possible co-operation between research, operational expertise and action. It is a kind of new frontier in whose development to invest resource in search of innovation, synergies, and new strategies for the times to come.

In the fight against financial crime, we cannot afford getting stuck in a foolish “Koenigsberg Bridges Puzzle style” run. We cannot proceed by trial-and-error in the name (and under the pressure) of urgency and practical needs, maybe realising only in the end that the course we took leads us nowhere.

If we want to win, proper research has to be fostered at global level. It is an essential component of the fight against financial crime, and it might offer Governmental Agencies and Policy Makers a precious tool. Indeed, global co-operation in research and methodology building is bound to become soon as indispensable as global co-operation in intelligence and knowledge sharing.

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