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EMBEDDED BANKING SECURITY LEVEL INDEX AND AIMED CONTROL TEMPLATE FOR BANKING SYSTEMS – IMPLEMENTATION EVALUATION USING THE VROOM-YETTON-JAGO CONTINGENCY MODEL

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ABSTRACT. An embedded Banking Security Level Index (B-SLI) and Aimed Control (AC) scheme for banking systems is proposed in this paper. In this design the B-SLI and AC anti money laundering techniques are fused together and used in sequence to expose a threat and subsequently ameliorate the security level of banking. The potential implementation of the B-SLI/AC template is then evaluated using the Vroom-Yetton-Jago contingency model. Study concludes that the B-SLI/AC scheme can be implemented as a focused collaborative effort that will increase the reporting entities willingness to commit to the anti money laundering effort. This approach draws on our previous research and it is part of the idei_822 project.

1. INTRODUCTION

In order to expose potential vulnerabilities and subsequently enhance the security level of banking this article proposes a sequential fusion of two anti money laundering instruments: the Banking Security Level Index (B-SLI) and Aimed Control (AC). The B-SLI is an indicator for assessing the security of financial circuits. It was created during the authors' previous research in the idei_822 project financed by CNCSIS. If a potential security threat is exposed using the B-SLI, the design proposed in this paper calls for the immediate implementation of Aimed Control (AC). Aimed control (or AC) is an order issued by the appropriate Supervisory Body (or Regulator) requiring specific financial institutions to lower the transaction report limits for a period of time, thus enhancing the security level in the exposed reporting entity. The potential implementation of the B-SLI/AC template is then evaluated using the Vroom-Yetton-Jago contingency model. The Vroom-Yetton-Jago Model is employed as a useful framework for identifying the best approach to implement the B-SLI/AC template. The results show that the B-SLI/AC if implemented as a focused collaborative effort will remove the communication gaps between the Regulator and the Reporting entities. This will in turn improve the perceived benefit areas and increase the reporting entities' willingness to commit to the anti money laundering effort thus increasing the security of the financial system.

2. BANKING SECURITY LEVEL INDEX (B-SLI)

The B-SLI provides critical auxiliary judgment and decision support for anti-money laundering service systems and is particularly tailored for the financial services industry in Romania.

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Its creation is based on the opinion of financial markets and banking professionals in the U.S., Bulgaria, Russia, Romania, Switzerland, Cyprus, Greece, Slovakia, and the UK.

The authors conducted a comprehensive survey during previous research (Stancu, Rece, Iorgulescu, Răduț, Maftai, 2008). One hundred and five professionals of the international financial markets were interviewed on issues ranging from the legal to reporting requirements and the effectiveness of international institutions involved in the fight against money laundering and financial crime. The preferred method for conducting the interviews was cold contact via email or similar methods with the request of following a link to a questionnaire. The questionnaire was designed based on research at the level of European and national institutions closely involved with AML/CFC as well as personal interviews with ONPCSB members. The survey was subsequently employed in the creation of a new instrument assessing the level of banking security: the Banking Security Level Index (B-SLI).

The Banking security level index (B-SLI) evaluates the security degree of financial circuits on a scale of 0 to 100, level 0 representing the lowest level of security while 100 being the ideal level. The B-SLI is based on own research at the level of European and national institutions closely involved with Anti Money Laundering and Counter Financial Crime (AML/CFC) (Stancu, Rece, Iorgulescu, Răduț, Maftai, 2008) as well as personal interviews with ONPCSB members. The shortage of quantitative information on the subject matter means the secondary sources used in the construction of the index are few and reside for the most part in the Yeandle, Mainelli, Berendt and Healy study in 2005 and the PricewaterhouseCoopers analysis in 2004. A very diverse set of opinions has been taken into account when arriving at the final set of criteria included in the index. This is thus the only index currently in existence that measures the security of banking channels simultaneously using 13 evaluation criteria as follows:

- I. 10 points are awarded for Money Laundering risk and Financial Crime legal adequacy.
- II. It awards for up to 10 points for an appropriate level of punishment to the risk of money laundering and Financial Crime.
- III. It allows for up to 10 points for an appropriate level of reporting requirements to the risk of money laundering and Financial Crime (ML/FC).
- IV. It allows for up to 10 points for an adequate level of security of financial and banking systems to money laundering and Financial Crime risk.
- V. Up to 10 points can be granted for a sectoral level of security that is appropriate to the risk of money laundering and Financial Crime.
- VI. It allows for up to 10 points for the efficiency of the involved institutions in detecting these phenomena.
- VII. It allows for up to 10 points for the efficiency of the involved institutions in stopping these phenomena.
- VIII. It allows for up to 10 points for sectoral efficiency of the methods, techniques and tools used to prevent and combat ML/FC.
- IX. It allows for up to 10 points for adapting the detection methods, detection techniques and detection instruments used to the challenges of new Money Laundering Systems.
- X. It allows for up to 10 points for adapting methods, techniques and tools used to combat the new Money Laundering System.
- XI. It drops up to 5 points for inefficiency in detecting the phenomena.
- XII. It deducts up to 5 points for inefficiency in stopping these phenomena.
- XIII. It drops up to 5 points for sector inefficiency of the methods, techniques and tools used to prevent and combat Money Laundering and Financial crime.

The B-SLI calculation primarily focuses on the extent to which the security level of financial circuits is meeting the new challenges arising from money laundering and financial crime. The B-SLI is deployed mainly using a questionnaire applied at the desired level of the reporting entities. The authors previously used the B-SLI to convey an overview of the actual status of the organizing and the functioning of the institutions involved in deterring financial crime and money laundering and as a measure for AML/CFC institutional effectiveness. In this

research however, the aim is to ascertain the degree to which the B-SLI can be used together with the Aimed Control (AC) in the targeting and augmenting the security of specific financial institutions.

3. AIMED CONTROL (AC)

Aimed control is the second stage of the proposed B-SLI/AC technique. Aimed control (or AC) is an order issued by the appropriate Supervisory Body (or Regulator) requiring specific financial institutions to lower the transaction report limits for a period of time, thus enhancing the security level in the exposed reporting entity. The aimed control order is issued specifically for the institutions marked as vulnerable in the B-SLI stage.

AC draws its inspiration from the New York Money Transmitter Geographic Targeting Order (GTO). The order was in effect in the 1996-1997 period and required 3500 agents to report information about the senders and recipients of all cash purchased transmissions to Colombia of \$750 and more. The order caused a dramatic reduction in the amount of illicit funds moving through the New York money transmitters and has demonstrated for the first time that the underground market does respond to regulatory and enforcement pressures (Kelly, 1997), a success the authors hope to match and surpass with the B-SLI/AC method.

Though the AC and GTO methods share some similarities the AC has clear advantages. AC represents a focused collaborative approach. AC will have higher perceived benefit areas particularly as a result of removing the communication gaps by involving the reporting entities directly in the development and implementation stage of the method.

The authors' previous research (Stancu, Rece, Iorgulescu, Maftei, Radut, 2008) has shown that the success of the AML/CFC strategy and consequently the level of banking security depend to a large extent on the reporting institutions' commitment to the objective of implementing the Anti-Money Laundering Strategy. Same research has shown that there are communication gaps between the Regulators and the Reporting Entities mostly in the perceptions of costs / benefits relations. This situation had posed difficulties in the implementation of other AML/CFC measures and consequently generated a lower security of banking. It is reasonable to consider that the removal of these gaps with the introduction of the B-SLI/AC in collaborative manner will improve the efficiency of the competent authorities even without an increase in the cost of the reporting requirements.

4. EVALUATION OF THE B-SLI/AC USING THE VROOM-YETTON-JAGO CONTINGENCY MODEL¹

A good anti money laundering strategy evaluation process must consider also the implementation phase. There is no use to select good methods which cannot be implemented. The Vroom-Yetton-Jago Decision Model (Vroom, Yetton, 1973, Vroom, Yagoo, 1988) provides a useful framework for identifying the best regulatorship style to implement the B-SLI/AC template. The model differentiates among five different implementation styles: two authoritarian (denoted AI and AII); two consultative: consultation with reporting entities individually (CI) and consultation with reporting entities as a group (CII); and a group decision making (GII).

The possible implementations of the B-SLI/AC template considered are:

1. Autocratic I (AI): Completely autocratic. Regulator chooses AC implementation parameters² or makes the decision by itself using the information available at the present time.
2. Autocratic II (AII): Request specific information. Regulator obtains any necessary information from reporting entities, and then decides on the implementation parameters itself. Regulator may or may not tell reporting entities the final purpose of its questions or choose

¹The model can also be found under different names: Vroom-Yetton-Jago, Vroom Yetton and Vroom-Jago depending on the exact technique used.

²Maximum and minimum duration of the AC order, reporting interval for the AC order, relation between the B-SLI vulnerability level and AC duration, relation between the vulnerability exposed by the B-SLI and the reporting requirements of the AC etc.

to give information about the AC parameters and the decisions it is working on. The input provided by reporting entities is in direct response to the regulator's request for special information. Reporting entities do not play a role in the definition of the AC nor in generating or evaluating its parameters.

3. Consultative I (CI): One-on-one discussion. Regulator shares the AC parameters with the relevant reporting entities individually, getting their ideas and suggestions without bringing them together as a group. Then the regulator makes its decision. This decision may or may not reflect reporting entities' influence.

4. Consultative II (CII): Group discussion. Regulator shares the AC parameters with reporting entities in group meetings. In these meetings the regulator obtains their ideas and suggestions. Then it makes the decision which may or may not reflect reporting entities' influence.

5. Group (GII): Consensual group decision-making. Regulator shares the AC parameters with team members/reporting entities as a group. Together reporting entities generate and evaluate alternatives and attempt to reach agreement (i.e., consensus) on key parameters. Regulator's role is much like that of facilitator, coordinating the discussion, keeping it focused on the problem and making sure that the critical issues are discussed. The Regulator can provide the group with its information or ideas, not trying to "push" them to adopt its AC parameters and is willing to accept and implement any parameters which have the support of all the Reporting Entities.

The implementation of the B-SLI/AC template was analyzed using the following criteria: the level of quality requirement (QR), commitment requirement (CR), regulator's information (RI), parameter structure (ST), commitment probability (CP), goal congruence (GC), reporting entities conflict (CO) and sufficient information (SI).

A Vroom-Yetton-Jago Contingency model in the shape of a decision tree model in which eight yes/no questions that must be answered in order from 1 to 8 when moving across the tree diagram from left to right was deployed. A combination of previous research and direct expert answers were drawn upon to complete the decision tree:

1. Quality Requirement (QR):

Q: How important is the technical quality requirement of the B-SLI/AC model?

A: High (In-depth interviews with O.N.P.C.S.B. members)

2. Commitment Requirement (CR):

Q: How important is the Reporting Entities' commitment to the decision?

A: High (Stancu, Rece, Iorgulescu, Răduț, Maftai, 2008)

3. Regulator's Information (RI):

Q: Does the regulator have sufficient information to make a high quality decision on its own?

A: No (Rece, 2010)

4. Parameter Structure (ST):

Q: Are the parameters of the AC model well structured (e.g., defined, clear, organized, time limited, etc.)?

A: Yes (International scientific debate and team meetings with representatives of the University Paris Dauphine, University of Rome Sapienza, Maryland and St. Petersburg Universities)

5. Commitment Probability (CP):

Q: If the regulator were to make the decision by itself, is it reasonably certain that the reporting entities would be committed to the decision?

A: No (Stancu, Rece, Iorgulescu, Răduț, Maftai, 2008)

6. Goal Congruence (GC):

Q: Do reporting entities share the organizational goals to be attained in solving the problem?

A: Yes (Yeandle, Mainelli, Berendt, Healy, 2005).

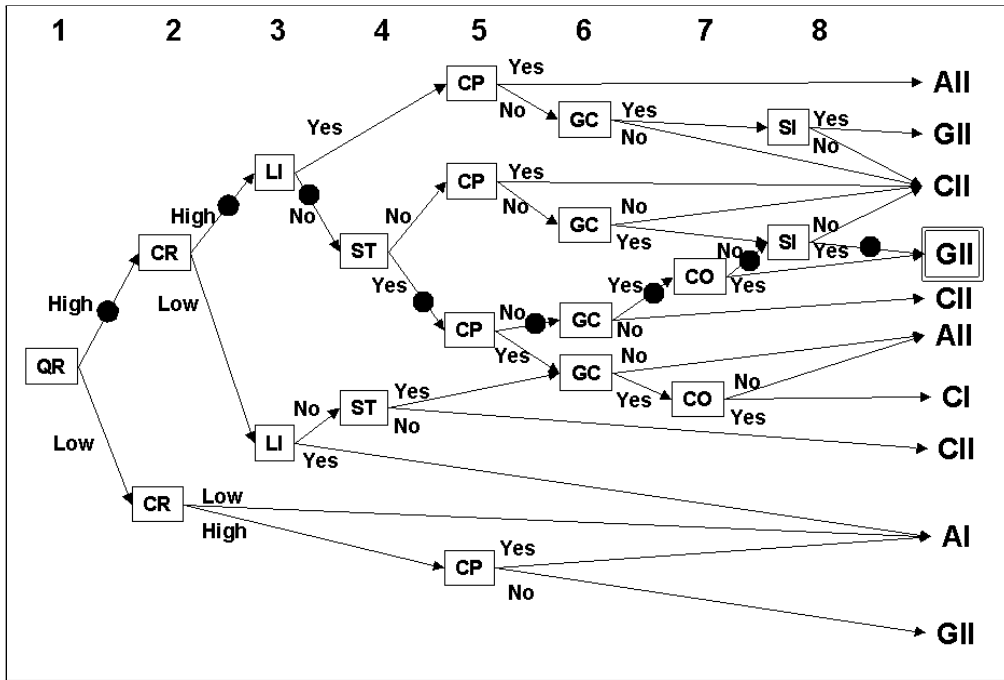
7. Reporting Entities conflict (CO):

Q: Is conflict among reporting entities over preferred solutions likely?

A: No (Stancu, Rece, Iorgulescu, Răduț, Maftai, 2008)

8. Sufficient information (SI):
 Q: Do reporting entities have sufficient information to make a high quality decision?
 A: Yes (International scientific debate and team meetings with representatives of the University Paris Dauphine, University of Rome Sapienza, Maryland and St. Petersburg Universities)

Figure 1. Vroom-Yetton-Jago Model³



The diagram above displays the Vroom-Yetton-Jago process used by the authors to select the best regulatory style when implementing the B-SLI / AC model.

The black dots mark the path in selecting the best B-SLI/AC implementation method. Because the quality requirements are high and also the commitment requirements are high then the regulator can not choose AC implementation parameters alone using information that is readily available. Consensual group decision-making is needed.

In developing a B-SLI/AC template the Regulator must consult the Reporting Entities at least on the following parameters: software platform integration,⁴ duration interval of the AC order, minimum and maximum reporting levels set by the AC order, the relation between the B-SLI vulnerability level and AC duration, the relation between the vulnerability exposed by the B-SLI and the reporting requirements of the AC. Other parameters of the B-SLI/AC template that can be proposed for consideration are: deviation on the turnover reporting limit, cash deposits/customer /month reporting limit, cash withdrawal/customer/month red flag limit, sales in cash/month limit, deposits/withdrawal/year limit.

5. CONCLUSIONS

The authors set out to develop an embedded Banking Security Level Index (B-SLI) and Aimed control (AC) scheme for banking systems. The authors used the B-SLI as an early

³Model Source: <http://faculty.css.edu/dswenson/web/LEAD/vroom-yetton.html>

⁴The possibility to embed the B-SLI/AC or AC within the software solution used, (NORKOM-ACTIMIZE, SYLCAT, FIRCOSOFT B-SLI/AC integration options).

marker for assessing the security of financial circuits. When potential security threats were exposed using the B-SLI, the design pushed for immediate implementation of an Aimed Control in order to enhance the security level in the exposed reporting entity. The Vroom-Yetton-Jago Model was employed as a useful framework for identifying the best approach to implement a B-SLI/AC template.

Results show that the Regulator should not make autocratic decisions when Reporting Entities acceptance is crucial for a successful outcome, and that there is a use in involving the Reporting Entities in the parameter selection process. This is because the AML/CFC strategy and consequently the level of banking security depends to a large extent on the reporting institutions commitment to the objective of implementing the Anti-Money Laundering Strategy (Yeandle, Mainelli, Berendt, Healy, 2005), (Stancu, Rece, Iorgulescu, Răduț, Maftei, 2008).

A consensual group decision-making implementation of the B-SLI/AC is recommended, with the parameters for consultation with the reporting entities being in the least: software integration options, duration interval of the AC order, minimum and maximum reporting levels set by the AC order, the relation between the B-SLI vulnerability level and AC duration, the relation between the vulnerability exposed by the B-SLI and the reporting requirements of the AC.

This focused collaborative approach will have higher perceived benefit areas (PricewaterhouseCoopers, 2004) particularly as a result of removing the communication gaps (Stancu, Rece, Iorgulescu, Maftei, Radut, 2008). It is reasonable to consider that the removal of this gaps with the introduction of the B-SLI/AC in collaborative manner will improve the efficiency of the competent authorities even without an increase in the cost of the reporting requirements. An ongoing iterative simulation on the effects of the B-SLI/AC adoption (Rece, 2010) shows that the mere inclusion in the national strategy of this vanguard component will generate imago-logic benefits and increase the attractiveness of the Romanian economy even if AC orders are never issued. Further results show that the B-SLI/AC could provide the grounds for shifting the National AML Strategy from a passive approach, consisting in the sheer implementation of rules imposed from outside, to a National AML Strategy defined based on internal needs.

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