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The Information Systems to Prevent the Impairment of Asset Quality in the Banks Balance Sheet

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Abstract: Non-performing loans (NPLs) that turn into bad debt or dead loans are a problem for Italy's banking industry. To some extent, this is unavoidable. Previously, Italian banks have given the impression that their risk controls for loans are unsuccessful because the banks own a disproportionate amount of NPLs. These banks are now paying more attention to the management of these risks (Vaidya, 2013). "Information Technology (IT) is a critical component in creating value in banking industries. It provides decision makers with an efficient means to report information about risk, profitability and precedent conditions for loan" (Huaiqing et al., 2002). The purpose of this work is, through a case study, to highlight the possibility of Information System (IS) to support a new integrated process of credit monitoring to prevent the impairment of asset quality, providing increasingly reliable data, availability on demand and real-time information, and facilitating the creation of the development of global knowledge and new reporting tools, as well as integration of areas of risk and business operating processes. The findings show that the system implemented in a small Italian bank provides enough information on credit monitoring activities to improve the quality of the loans held in portfolio.

Key words: data quality; banking information system; asset quality; non-performing loans
JEL code: M15

1. Introduction

Since the 2007-2009 financial crisis, Asset Quality Review (AQR) has become a critical element of a macroprudential regulation both in Europe and in the U.S.A. (Acharya et al., 2012). The main purpose of such a regulation is to guarantee financial institutions sufficient capital, thereby strengthening the resilience of the whole financial system. The U.S.A. successfully started their Supervisory Capital Assessment Program in 2009, while the Committee of European Bank Supervisors (CEBS) conducted its scenario tests in 2010, but received some criticism (Acharya et al., 2014). While the U.S.A. program included 19 banks, with calculated combined capital shortfall of $75 billion, which was raised in private markets six months after the tests, in Europe the tests

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performed in 2010 based on a sample of 91 banks with an estimated total shortfall of €3.5 billion. The scenario test was repeated the following year by the European Banking Authority (EBA), which replaced the CEBS, basing the study on 90 banks, finding that only eight banks were eventually required to raise a total of €2.5 billion in capital. The main criticism of these tests was based on the idea that not sufficient importance was given to risk factors such as sovereign risks. More recently EBA has developed a structural framework based on quality asset review principles with the purpose of cleaning up the balance sheets of Europe's largest banks. Consequently banks require a new managerial approach to data and information to improve their ability to collect and to elaborate them in a more systematic and objective way. Banks need to make a more extensive use of Information Systems (IS) and Information and Communication Technologies (ICTs) to manage their assets properly and to consolidate information. For a long time they have used ICTs to manage financial instruments without a systematic, integrated approach. Nowadays a new type and level of information, with a new role, is required. Banks have therefore to develop a new and more suitable information system. The importance of management data obliges banks to reinforce information systems and to raise the quality level of the data also from the point of view of regulatory reporting (Bank of Italy, 2014). This presupposes the preventive standardization of the "key data", which requires the banks to produce consistent granular data on a regular basis and in reasonable time (Data Quality). Finally, as a third Data management system, the bank must show the capacity for adaptation of the organization and of the related processes for regulatory and compliance purposes (Organization and Process). This work analyses the contribution of IS to the new integrated process of credit monitoring and considers how this process could guarantee the maintenance of the high quality of the loan portfolio, the only guarantee of achieving satisfactory business performance and thus creating value for shareholders (EBA, 2013a). Limiting our analysis to the issues of the monitoring of loans, it can be seen that the aim of the new national discipline (the fifteenth update of the Bank of Italy Circular n. 263 of 27.12.2006 (Circ/263)) is to improve the risk control function, which analysts, researchers and regulators continue to indicate as being one of the major determining factors in the increase in NPLs in bank balance sheets. The case study presented in this work is a good experimental model for at least two reasons. Firstly, the bank has always maintained a strong presence in the region and promoted its social and economic development with significant credit intermediation operations. The cultural emphasis on customer relationships gives us a better understanding of the elements of innovation that affect the function of credit monitoring with regard to the relationship between the responsibilities of the business unit and risk management. The assessment of credit monitoring requires better information, improved management tools, and constantly taking advantage of innovation. The second reason is the shift in interest from large to smaller banks, which are the true backbone of the Italian economy, as they are primarily responsible for wealth and economic growth, since they support investment initiatives of SMEs, which account for over 93% of all European businesses (Bank of Italy, 2014b). The choice of the case under examination was determined by its specific features such as, orientation towards traditional banking business expansion, and, last but not least, the recent implementation of a system of rating of the retail segment. This allows the bank to have a more advanced management of the risk of counterparty default with the use of econometric models developed in collaboration with an external consulting company. In this context, the research questions are as follows:

- In what way does the use of management systems for the compilation of templates, models that are predefined by European Banking Authority (EBA), improving the consistency between accounting and management data, create the opportunity to implement a new integrated process of credit monitoring to prevent NPLs?

- How can IS contribute to the verification process monitoring of credit for the purpose of early warning (real time) deteriorating of credit quality?

The use of a case study method can yield initial answers to these questions and indicate the possible benefits for banks implementing available loan performance monitoring processes and for their stakeholders. The remainder of the paper proceeds as follows. Section 2 provides an analytical literature review, Section 3 provides a description of the research method. In Section 4 we present the empirical research, through a description of the case examined; the results underline weaknesses and strengths of the IT solution and its pivotal impact emerging from interviews. Our conclusions are presented in the last Section.

2. Literature Review

Over the years most the studies and research have focused on the role of information systems (IS) in terms of services offered by banks (Chan & Lu, 2004; Lai & Li, 2005; Sachan & Ali, 2006). Special attention was dedicated to what is called the Banking Information System (BIS) and on its capacity to provide services such as online banking, online credit card management, and automated teller machines (ATM) services. The literature deals in particular with the issue of trust and the exchange of personal and private information in online interactions (Gefen et al., 2003; Pavlou & Gefen, 2004). Consequently studies focus mainly on the customer side, in terms of use and usability of information technologies, whereas this paper aims to analyze the role of information systems in operational management in particular contexts. More specifically it will examine how information systems can support banks to improve systems for monitoring asset quality. The literature examined focuses on the impacts of IS technology on the prevention of NPLs in a general context without considering specific smaller banks: most of the contributions refer to the IS in large banks and more recently to smaller banks (Seese et al., 2008; Indian Institute of Banking Finance, 2013). Few contributions focus on the implementation of advanced IT solutions in the smaller banks aimed at improving asset quality in the management of the loan portfolio (Egloff et al., 2007; Streff, 2009). From 2008 onwards, NPLs have increased both in Italy and in Europe according to Reuter's data of April 2014. It is a unanimous opinion of experts and researchers (Caivano et al., 2010; Bini & Smaghi, 2009; Bernanke, 2009) that the conditions of realizability of receivables should be attributed to the trend of the economy and to the presence of endogenous factors in the credit process (Islam et al., 2005; De Bonis & Silvestrini, 2013). The process of establishing a European Banking Union (EBU) began on November 4th 2014, with the implementation of the first pillar of the Single Supervisory Mechanism (SSM), which is a prerequisite for Comprehensive Assessment (CA), a centralized, in-depth evaluation of banks' soundness, and Asset Quality Review (AQR) is one of the three pillars of CA. It aims to achieve harmonized definitions of non-performing loans and forbearance; guarantors of the principles of disclosure of bank balance sheets (EBA, 2013a). The activities of the AQR, although they have involved a small number of large banks, have influenced the choices of credit intermediaries in terms of management and the monitoring of credit risk (EBA, 2013b; ECB, 2013). The fifteenth update of the Bank of Italy Circular n. 263 of 27.12.2006, defining a set of rules aimed, among others, at strengthening systems of Risk Management (RM) which recent empirical evidence has shown to be highly vulnerable, introduces important innovations in terms of the monitoring of credit quality, especially for the treatment of migration risk (Bank of Italy 2013).

From a strategic point of view, a safe and efficient IS makes it possible to exploit the opportunities offered by technology to expand and improve products and services offered to customers, to enhance the quality of work

processes, to promote the dematerialization of securities, to reduce costs also through virtualization of banking services. From an operational point of view, an information system provides managers with detailed, relevant and up-to-date information for taking timely decisions and for the proper implementation of the process of risk management advocated by the new regulations. Through an efficient information system it is possible to speed up the transmission of messages relating to transfers of funds between banks; to implement an efficient flow of data and information between branches and central offices; to reprocess and reuse data concerning the various operations more than once and for different purposes; to provide customers with an ever wider range of products and computer services, particularly in the area of self-service banking. A further step in the modernization of the bank sector is the introduction of technologies relating to business intelligence through which is realized further and important change in the approach to data analysis. To develop a synergy between business strategy and Information Technology (IT) architecture, firms must develop organizational expertise in IT architecture. This is the organizing logic for applications, data and infrastructure technologies, intended to facilitate the firm's business strategy. If in the past the software houses tried to predict and to define already in the design phase the information needs of managers, today's information systems allow the exploration of the heritage of the available data, avoiding user problems of regrouping and rationalization of information resulting from their dispersion in different platforms (silos) and in large archives. The silos architecture consists of architectures of individual applications rather than one for the entire enterprise; a business system can fail where there are different goals and purposes within the system. However, it could work together again with enough coordination and sharing of objectives (Abedalla, 2014). The Silos Effect refers to a lack of information flowing between groups or parts of an organization. In an organization, the Silos Effect limits the interactions between members of different branches of the company, thus leading to reduced productivity. Application silos can compete for capital funding using simple cost-benefit analyses. System benefits are predictable (albeit frequently overstated), and outcomes are measurable. By allowing variety in technology platforms, application silos are expensive and difficult to maintain. For this reason the banks adopt IT Architecture Process-driven which is characterized by the centralization of production data and the verification of their quality.

Previous studies (Gupta & Collins, 1997; Halandy et al., 2009; Hamdan & Abzakh, 2010) concluded that there is a need for effective internal control that keeps abreast with developments in an IT environment. In other words, IT control activity evaluation impacts potential integration with administrative and financial information systems. The impact of IT on the efficiency of control does not differ from the traditional objectives of internal control systems even if there are information security and safety risks (Al-Qudat, 2009; Seese et al., 2008). Indeed, when the information used by financial institutions is often entirely IT generated, managed and controlled, the confidentiality, availability and reliability of financial information is crucial (Pavel & Unchiaşu, 2013; Montoya et al., 2010). It is obvious that the banking IS can be reduced to two subsystems: the operational and the directive. These two sub-systems, though highly integrated, fulfil different purposes. The monitoring of organized activities was mainly visual and manual until the progressive introduction of technology into business operations. This principle is particularly important for the IT function within a financial services organization. IT is often implemented to manage, control and report credit risk, market risk and other types of core business risk (IT Governance Institute, 2010; Mehta et al., 2006; Indian Institute of Banking Finance, 2013). Referring specifically to our analysis, the RM function has undergone a process of regulatory revision that for some scholars (Kiff et al., 2013; Standard & Poor's, 2014) represents a driving force for the implementation of effective monitoring of debt positions, for purposes of control of asset quality. As demonstrated by some studies (Breinlinger et al., 2003), for a long time the function of RM in the context of credit risk, was responsible for the estimation of the Expected Loss (EL) of the loan portfolio,

the definition of migration rates between classes of NPLs and the type of collateral and the recoveries for technical forms. Moreover, in the credit process it contributed to the evaluation of impairment and to the writing of the portfolio in collaboration with the managers of the business units (BUs) (Altman & Saunders, 1998; Islam et al., 2005). Still now, regarding impairment, the methods of estimating losses on a loan portfolio are based on binary logic, so that, for each debtor, only two positions are recognized: default or non-defaulted. It follows that the prospective loss on a loan portfolio in the holding period is expressed as the sum of the product between the PD and LGD of all debit positions classified in the portfolio (Daffie & Singleton, 2003). This methodology leads to the determination of the loss by default and not the determination of changes in the creditworthiness. However, in the range of temporal reference, the position appears to be non-defaulted, but might undergo, in a very short time, a deterioration in credit quality (Altman et al., 2005). The main objective of the function of monitoring performance is the identification of positions in the past due to which restructuring activities credit is required. This function is supervised by BU and by specialized figures of RM (i.e., CRO, Relationship Manager, Monitoring Officer), and is supported by IS technology. In the carrying out of AQR, the European Central Bank (BCE) considered it appropriate to propose an operational framework that would make the loan portfolio quality analysis of the various banking institutions comparable (EBA, 2013). The framework indicates the criteria of segmentation of customers into more detailed classes of risk with respect to the criteria used in balance sheet practice (Table 1), and the modes of standardization of data, qualitatively and quantitatively, (Triggers) for the evaluation and monitoring of credit exposures (Table 2).

Table 1 Risk Bucket

Default
1. Default > 12 months
2. Default > 6 months
3. Default < 6 months
Cured position (Loans with characteristics of being "in bonis" at the moment of classification but in default in the last 12 months)
4. High risk cured
5. Normal risk cured
Normal positions (Loans for which none of the above characteristics recur)
6. Normal cured
7. Normal

Table 2 Credit Triggers

1. Significant financial difficulties of the debtor
Downgrading
Default (according to regulatory definition)
Reduction in a year of 50% of the equity of the debtor following losses
Request for extraordinary financing
Drastic reduction in the value of collaterals
Drastic reduction in the value of annual turnover
Drastic reduction in the estimates of future cash flows
Debt Service Coverage Ratio (DSCR) < 1.1
2. Violation of the clauses of the loan agreement
Receivables overdue > 90 days on any of the loan
Violation of covenant not approved by the bank
3. Restructuring of debt
All the positions classified as forborne non performing (according to the EBA definition)
4. Probability of insolvency/restructuring
Debtor in bankruptcy proceedings
5. Disappearance of an active market for the funded asset

The interpretation of the triggers is entrusted to the exclusive judgement of the manager of the individual debt

position, who, because of direct contact with and detailed knowledge of the debtor, must integrate such triggers in the system of evaluation so that the monitoring of them for purposes of timely identification of situations of downgrading will be systematic.

Such identification is a guarantee of the correct classification of the positions belonging to the most risky portfolios (large corporate, real estate e SMEs). This will require the banks to produce standardized reports according to predetermined models and formats (templates), the latter constituting the support for the integration of the various business databases necessarily integrated with qualitative and quantitative information required by the AQR (balance sheets, detailed information on the assessment of collateral, etc.). Thus, the customers are classified into three macro-classes of management (Table 3) depending on the degree of solvency automatically detected by IS; the outputs of the system are then sent to the RM through a dedicated Web-based tool, finally for each management class a specific protocol is defined that commercial operators must follow in order to safeguard the quality of credit.

Table 3 A Protocol Definition for Each Management Class in accordance with BCE's Framework

Performing loans (loans with appropriate behaviour)	1. Continuous monitoring to promptly evaluate any signs of anomalies in credit relationship	1. Continuous interaction with the customer to drive the current activity in order to prevent the assignment of a worse rating class
Cured loans (loans with frequent anomalies which may be removed)	1. Review of the credit rating to reduce the risk profile; 2. Application of early warning signal relative to permanence of the loan in the management class	1. Review of credit conditions a. composition of credit lines; b. reduction of the debt exposure c. release of new collaterals **Special focus by the Management Credit Monitoring**
Non performing loans (worsening in the risk profile)	1. Progressive and full recovery of the exposure by defining a recovery plan 2. Timing of the repayment of the exposure (i.e., one year of 18 months)	1. Subscription by the customer of the debt recovery plan; 2. Obligation for the defaulting customer to repay the overdraft within the agreed time plan; 3. Request for integration of collaterals or release of new collaterals to safeguard a disciplined return. **Special focus by the Management Credit Monitoring**

To understand the significance of the "new" regulations contained in Circ/263 and its effects on the quality control of the credit for the creation of value for an enterprise, we should shift the focus from the control of expected losses, for the establishment of adequate levels of provisioning and of economic capital, to the control of the change in value that loans and receivables might undergo in a holding period. We are talking about proactive management of credit exposures, an asset valuation of the loan portfolio, for which a careful diversification of the portfolio is important because it counteracts the deterioration of all positions (Albanese & Lawi, 2004): the price differentiation on the portfolio as a function of PD that ensures the coverage of operating costs, of capital allocation and of funding; the monitoring activity oriented to the control of migration risk rather than to the management of the loans; the periodic review of the rating of the debtor useful for the measurement and prompt management of the risk of migration; the timely and effective action times for the recovery of problem loans (Resti & Sironi, 2009). It is the unanimous opinion of experts and researchers (Hibbeln, 2010) that it is in these last two stages of the credit process (performance monitoring and recovery activities) that the benefits of the control of the second level of RM may emerge, according to the standards of the new legislative system, which assigns to the Chief Risk Officer (CRO) the role of guarantor of consistency in the assessment of claims; a control typically of the second level, and not a mere verification of compliance with rules of management of problem loans, but rather a functional check of the formulation of judgements of consistency of ratings, adequacy and appropriateness of the process with the provisioning policies. The new rules in fact further a dialectical relationship between the CRO and the unit-risk takers. They also enforce the preparation of the document Risk Appetite Framework (RAF), (Bank of Italy 2013)

which identifies all types of risk that banks intend to take and, for each type of risk, the RAF identifies the tolerance thresholds and operating limits under both normal operation and in stress conditions. This makes continuous interaction between the RM, which defines the tools, and the BUs, which must use the necessary tools. In this way we can define a condition for which the function of the RM is the guarantor of the AQR process. The stages of the monitoring and recovery of the credit process will be overseen by the BUs and the RM, although each will continue to maintain its distinctive competence, respectively, for the functions at the first and second level. However, in the case of different assessments this will depend upon the opinion of the CRO; a new rule that should not be interpreted as a solution to the discrepancy in evaluations of the loan portfolio but rather as an incentive to a virtuous dialectic between the functions in question, aimed at sharing preventive tools and models proposed for controlling the quality of credit. Proper management of these steps requires a regular flow of two-way information between the business units and the RM qualitative, quantifiable and processable data.

3. Methodology

This work aims to analyse the contribution of the IS to the integrated process of credit monitoring, highlighting its implications through a qualitative case study methodology. The case is focused on a banking group which operates in credit intermediation activities and has strong local roots.

The work has been formulated on the basis of the following propositions:

- The governance data, the aggregation of the data relating to credit risk and the automation of the processes, as required by the AQR, make it possible to deal with the growing expectations of adequacy of loan performance monitoring.
- The information systems are a priority in the strategic management of non-performance loans.

In accordance with the literature (Chen et al., 2010) we carried out one in-depth pilot interview in order to elicit early qualitative feedback and to better refine our research design and the subsequent survey. In the interview an open semi-structured questionnaire is used. Subjects were asked to define their Asset Quality Review of counterparty default using econometric models developed in collaboration with an external consulting company. The latter completes the process of revision of the rating model for which IS have been implemented. The choice of the case was determined by its specific features such as: orientation towards the traditional banking businesses, the role of “reference bank” in Tuscany and last but not least, the recent implementation of a system of rating of the retail segment. These characteristics require taking into account several aspects. These include: the variety of education and culture of the staff; functional relationships and appropriate technology resources. All these features affect the conception, development and deployment of IS solutions to be adopted in order to achieve the business objectives and above all to improve the asset quality.

4. Empirical Research

The case study is based on a small-size banking group operating in the Tuscany: the Cassa di Risparmio di San Miniato (Carismi).

The Banking Group consists of the following “macro components”: the Holding Company (Carismi) performs lending activities and also carries out strategic and governance functions of the Group. The Service Company responsible for some activities which include support lending activity is in order to achieve economies of scale and scope and to maximize efficiency.

Carismi provides its customers with a distinctive service, pursuing the opportunities offered by the market in a context of rigorous management and creating value for its stakeholders. It has a group design, manufactures and sells a wide range of high technology-content products and services in order to meet the needs of its customers. It is characterised by a highly dynamic culture, a strong focus on ethics and compliance, and commitment to following the evolution of the market and provide advanced technical solutions. In compliance with Circ/263, the control functions (internal audit, compliance and risk management) were radically revised within the Group; in particular, the function of RM has acquired independence from other control functions and cooperates with the BUs for the definition of the Risk Appetite Framework (RAF), a document which identifies all types of risk that the Group intends to take and, for each risk, the tolerance thresholds and operating limits in normal operating conditions are stressed (Bank of Italy, 2013).

The starting point of our research is to analyse the role of IT in supporting credit processes to prevent the impairment of asset quality in the balance sheet; the aim is to demonstrate whether it is possible to achieve the highest quality of the credit portfolio, exercising control over all the phases involved in this process and, for each of them, to highlight the key variables which indicate a progressive worsening of creditworthiness. This makes it possible to respond to this rapidly eliminating the anomalies identified. The monitoring of credit is based on the structuring of the processes that takes into account the models proposed by the EBA the classification of customers includes therefore two positions: “performing loans” and “NPLs”. While using credit, the position of the customer can become an “anomalous” state due to the occurrence of new negative events. Knowledge of these events is linked to the bank’s ability to intercept and prepare the tools for monitoring positions systematically, in order to identify “anomalies” responsible for the deterioration in credit quality. The change of state occurs as a consequence of forbearance, applying the technique of override, a tool that is provided for by the regulations that allow “modification” of the rating attributed to the debtor according to automated procedures in the context of creditworthiness assessment. This process is carried out by the Monitoring and Problem Loan Management (MPLM) and the RM function on the basis of the mapping of control activities to be carried out within the scope of responsibilities of control for first-and second-level. Thus, MPLM and RM are responsible for the monitoring of loan performance. RM defines the tools for granting, monitoring, dispensing and recovering loans; the RM then checks that the tools provided by the bank are abided by the BUs and, in the case of conflicting estimates, the decisions applied by the RM function will be applied. This innovation is very important; the RM has to assess whether those responsible for the BUs comply with the credit policies, which the bank has defined in the RAF. Therefore the activity of credit risk control performed by the RM assumes its full importance in the last two stages of the credit process: the monitoring that indicates the emergence of trend anomalies on which it is possible to act quickly to restore the initial situation and the recovery phase, which goes beyond the scope of our analysis, despite its importance. RM has identified some early warning indicators able to represent possible abnormalities compared to the process of monitoring of the first level, which is carried out by MPLM.

These indicators refer to the following stages of the process of managing and monitoring credit: 1) classification of positions; 2) adequacy of capital amount; 3) adequacy of the recovery procedure.

The results of the checks are subject to periodic reporting to the BUs and to the business structure. In this context, RM checks that the transactions under investigation are classified in accordance with the regulations of EBA and with the rules established by internal regulations, also regarding the time spent in the range. It was said that the Carismi loan portfolio is split into two main categories of credits: performing and NPLs, in compliance with Circ/263 (Table 4).

The first class of credit includes positions that are performing and in these tables are not considerate. The other class of credit includes NPLs: past due; restructured loans, objective substandard loans; substandard loans; and NPLs. The table indicates that in the case study analysed, some controls can be effectively carried out automatically (if processed by IS) and others manually (if revisited with use of the override — a discretional modification of the rating itself) with respect to the positions of observation-recovery and past due training of troubled loans. The last column shows the frequency of the checks.

Table 4 Segmentation of the Carismi's Loans Portfolio

Credit positions	Definition	Early warning signal	Method of downgrading	Frequency of the checks
NPLs	(a) Past due	(a) exceeded 10% of used on the loan;	(a) Automatic	(a) quarterly
	(b) Restructured loans	(b) changes in the original terms of the loan;	(b) Manually	(b) quarterly
	(c) objective substandard loans	(c) loans over 100.000€ and over 60 days in this range; loans under 100.000€ and over 120 days in this range;	(c) Manually	(c) quarterly
	(d) Substandard loans	(d) over 18 months in this range;	(d) Manually	(d) quarterly
	(e) NPLs	(e) discrepancy between adjusted doubtful loans blacklist of Central Risk	(e) Manually	(e) monthly

It emerges from the table that the migration towards positions of greater risk occurs mainly manually because the automatic systems of rating assignment are not able to process soft information; as the review process of asset quality cannot totally exclude the qualitative elements of the customer relationship, which represent the core variable in credit management, the qualitative elements must only be processed manually by overriding. And this is a difference from the larger banks subject to AQR activity; the latter need qualitative/quantitative information (defined respectively as soft and hard information) that are necessarily standardized and are indispensable for the development of forms of remote monitoring as well as statistical tools for the identification of anomalies; in addition, they need detailed data. All of this requires the use of tools and complex and costly statistical methods, including linear scoring (Myers & Forgy, 1963); logistical regression (Wiginton, 1980); the method of tree classification (Makowski, 1985).

The smaller banks, such as Carismi, with strong contacts with the local area, establish credit relationships also with qualitative elements of customer relationships that do not fit in the IS due to the complexity of the data and the cost associated with the information process. In order to ensure that the deterioration of the loan portfolio is detected promptly the bank undertakes a periodic review of the receivables and a verification of the quality of the loans whenever those controlling them receive indications of a significant decline relative to the portfolio or part of it. A judgement of impairment focuses on the ability of the borrower to repay the amounts due, as set out in the loan agreement; the analysis of this ability to repay is the most important element of the bank-customer relationship. It is upon this aspect that smaller banks build their reputation. The qualitative information heritage is in fact held by the sector managers (MPLM function), who in turn liaise with the RM for the performance monitoring of credit risk. On the basis of the instructions of Circ/263, the criterion of integration of rating methods adopted by Carismi is override. The automatic systems of rating assignment are not able to process soft information; the activation of override on the basis of predefined qualitative information can determine upgrading or downgrading variations in the rating

assigned to the debtor by the automatic system: in the first case, the proposals for improvement (upgradings) are subjected to a validation procedure by the RM; viceversa in the case of downgrading variations the validation is automatic. The monitoring system of the bank in our case study should be based on a reporting system that is capable of measuring the previously identified indicators. For example, the table shows that the positions exceeding the amount of 100,000 Euro, in the class of objective substandard loans are extracted from the data processing IS MAC quarterly, and stay in the class longer than 60 days as an early warning signal, and are indicated by the RM to the MPLM, which should then provide an adequate motivation. The classification of substandard loans can be automatic or manual. The former regards objective substandard loans. The Credit Monitoring Service can carry out the downgrading of the positions manually, when the anomalies met are detrimental to the successful completion of the financing position. Therefore, in cases of substandard banking carried out automatically within the procedure, the Credit Monitoring Service decides the downgrading. The management of objective substandard loans, the treatment of which is assimilated into that of substandard loans, consists of the preparation of plans for the restructuring of the debt, even in part, or the repayment of the outstanding debt. Where the requirements are not met, the conditions occur for the classification of non-performing loans. This type of monitoring is therefore not carried out at the last stage of the credit process, in which we have to decide “when” and “how” to establish procedures to recover the credit, but rather it concerns all stages of the credit process As such, it could lead to a virtuous cycle that would improve the quality of the loan portfolio.

With reference to the second question, the rules contained in Circ/263 recognize the important role of the data management systems for banking organizations in that the automation of the processes and monitoring of data security will make it possible to meet the growing expectations of rapid amd accurate responses. The monitoring system should be based on a reporting system that is capable of measuring the previously identified indicators. The purpose of reporting within IS is to provide analytical documentation on meaningful activities. Such disclosures should be as up-to-date and correct as possible and therefore should not generate inconsistent interpretations. Once the above activities have been completed, the aim is to redesign the IT system. In this way, for ‘‘every point in time’’, it can identify the contribution to RM of the operating results in all phases of the process, taking into account deviations, the causes of variations, and the impact on the NPLs.

Carismi uses a transactional database that can, in turn, be used to develop an analytical DB or ERP system, possibly supplemented by external data sources and processes.

The continuous monitoring of credit processes requires a group to use the reports prepared by the transactional database as well as new forms of communication through reports, direct conversation with customers, qualitative questionnaires.

Data can be extracted from the mass. These extractions can be highlighted where there are exceptions from the norm; in this case there is a phase of the analysis of the reasons for these differences.

Data security is a significant challenge: more information generates more value for those who use it, but confidential data also generate risks and have legal implications. The role of continuous monitoring is to ensure the reliability of the data; the monitoring of credit must be supplemented by data validation mechanisms that can provide an adequate level of privacy. The organization of the IT structures in Carismi presents a specific physiognomy, characterized by strong and critical points, depending on the sourcing model adopted. In particular, it has opted for a co-outsourcing model so that it keeps the control of the application portfolio (shared service) in sourcing and the technological management in outsourcing. The group has adopted an ERP solution; however it relies on a management reporting system that is based on data processing according to the information needs of the

individual management areas. IS has a marginal role; there is only qualitative information in the questionnaire that the manager of the position had filled in by the debtor. The results of choices cannot be extrapolated, because the analyses are made on a judgemental basis and also aim to include examples of good practice. Carismi deals with each case on its own creditworthiness rather than applying general, rigid rules: this is because the projects selected for monitoring are not established on a statistical basis, but rather on a relational capital basis.

In any case, the definition of the rules ensures that the data are: complete (it must be possible to export them from the branches on-line and off-line and integrate and aggregate them with other qualitative information and disseminate them over the net); primary (digital assets must be presented in a granular so that they can be integrated and combined with other data in a digital format); timely (users must be enabled to access and use data on the network quickly and immediately; accessible and available for both the first level and second-level controls; reusable (to create new resources) and permanent (to generate value). The quality of the data is always guaranteed since for each manual correction the date, hour, author of and reason for the intervention, operating environment and data preceding the adjustment are recorded; the data are kept with a granularity that allows the various analyses and aggregations required by the procedures for exploiting the same. Therefore, even in the absence of IT Architecture the checks on the correctness and squaring off for purposes of verification of the correct storage of the summary data are guaranteed. In essence, the refinement of the control will be followed by the need for an information system, essentially making the action of risk management more effective. The coherence of IS with the production of reporting in support of credit monitoring is confirmed by the data contained in the first three-monthly report presented by the RM Function of the bank at the Board Meeting on November 11th 2014, and represented in the table below:

Table 5 Transition Matrix for Credit Status

Credit status	Sept-14	June-14 ΔWeight used	Sept-13 Δ Weight used
Total "in Bonis"	78.79%	-1.93%	-3.30%
In Bonis	69.50%	5.85%	-3.38%
Past due not degraded	9.29%	-7.78%	0.08%
Total Npls	21.21%	1.93%	3.30%
Past-due	1.60%	-0.42%	-0.26%
Restructured	1.60%	0.02%	-0.40%
Substandard	6.94%	1.89%	2.51%
Npls	11.07%	0.45%	1.45%

Source: Carismi, Quarterly report on credit monitoring, November 2014, Internal document.

As can be deduced from the table, the variations in the weight used indicate a "positive" trend from 2013 to 2014 in that the weight of the overdue debts diminishes, the weight of the restructured class increases, even though the quality of the performance monitoring assumes importance for the management class of the in bonis credits. The impacts deriving from the application of the credit policies defined in the RAF, determining a considerable migration of the positions towards higher risk classes, made it possible to render the activity of recovery of impaired loans more effective and more efficient, generating a control of the NPLs in the bank balance sheet. As other studies have shown (Montoya et al., 2010), the consequences of the expansive role of IT tasks and base technology will be that the bank will have to regularly implement and manage complex and expensive IT systems at an integrated level of organization. This will include the planning of company resources (ERP) and global collaboration platforms.

5. Conclusion

In addressing the contribution of IS to credit monitoring activity for asset quality control, we have focused on two main issues:

(a) the implementation methods and use of the criteria of a standardized model (template of the ECB);

(b) the relevance and importance of IS in supporting the asset quality process and its potential benefits as well as the main key risk indicators that the RM uses to promptly identify the impairment of asset quality.

In our opinion different banks have different criteria of assessment of creditworthiness and they use different analyses of migration between credit risk classes. The relationship between bank and enterprise must in any case develop putting information clarity first and enabling banking institutions to acquire knowledge of the reality of the business. For this reason the elements considered include hard information and soft information reprocessed according to particular statistical programmes that are different in the banks according to their size. However the entering of qualitative information in the credit risk models is not always easy because of the complexity of converting them into quantitative terms (hardening soft information). The framework defined by the BCE defines the criteria of segmentation of customers into more detailed classes of risk with respect to the criteria used in balance sheet practice, and the modes of standardization of data, qualitatively and quantitatively, (Triggers) for the evaluation and monitoring of credit exposures. Our case study on Carismi confirms our first proposition: the AQR process could help to reduce the impairment of the asset quality of financial statements to the extent that it is able to activate a careful analysis of migration between risk classes. An examination of the mechanisms through which migration between risk classes changes the margins in lending highlights the benefits arising from the variation of the monitoring from the perspective of risk control. For these purposes the following are relevant:

(1) the allocative efficiency, defined as the capacity for diversification of the loan portfolio, which could achieve a reduction in the risk of impairment of the joint debts;

(2) the revision of the rating and the value of collateral;

(3) the timeliness and effectiveness of recovery of non-performing loans.

The templates defined by the EBA play a fundamental role in the implementation of the activity of credit monitoring and in fact they constitute a basis for the structuring of information on credit; the bank is aware that it will soon have to move towards the application of information systems that are also able to process qualitative information. For this reason, Carismi perceives the need to harmonize accounting and management data for purposes of implementation of an increasingly integrated process of credit monitoring. The template therefore represents an opportunity and not a regulatory constraint. At the moment, IS is not a strategic priority, since current information cannot be structured in a system, but the information could be structured for the so-called “phase two” AQR which will no longer see only the “larger banks” involved, but will become a priority also for the smaller ones. Our second proposition was rejected, but in the future it will be necessary for the support of risk management in the decision making process and for facilitating performance evaluation. This work contributes to an initial discussion of the potential implementation of AQR processes in smaller banks given the Italian legal framework; it discusses the control management tools implemented in smaller banks and their possible benefits, as well as how a culture of continuous credit monitoring and performance measurement can be generated within Carismi. This work provides evidence of the possible benefits to the bank’s performance and thus encourages government policies that would incentivize the use of new IT tools by smaller banks in management and control processes of asset quality review. Because this research is in the initial phase, this subject will require further analysis.

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