Strategic Role of Dashboard Application in Enhancing Crisis Management Capabilities in Organizations
Field study on Jordanian cellular companies

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Abstract
This study aims to investigate the impact of Dashboard to detect necessary early warning signals and readiness in Jordanian communications companies. The study’s population consists of all managers and users of Dashboard in two Jordanian cellular operators: Orange and Umnieh, totaling (84) employees. The study employed comprehensive survey on all members of the researched topic, and found that there is a significant effect of Dashboard on the detection of necessary early warning signals and preparing for them

Keywords: Dashboard, Crisis Management, Early Warning Signals, Readiness, Prevention, Preparation, communication Companies, Jordan

Introduction
The current and futuristic rapid changes that have occurred in organizations in the light of globalization, removal of borders, organizational change, and intense competition between organizations to acquire markets and customers is a real challenge for business, organizations, and their leaders. This challenge will leave clear implications regionally and globally, and drive organizations to develop and change their vision, philosophy, policies, systems, and methods towards crisis management in an endeavor to maintain survival and growth, and achieve objective in consistent with the requirements of our era.

The major complications the business environment face and the sheer amount of data and information that is processed, stored, and displayed to be used by organizations have formed a big challenge for organizations. This huge amount of data and information should be well-exploited to guide organizations and follow up their performance in general to achieve desired goals. Information technology has provided a set of systems that contribute to improving the decision-making process. Organizations can use these systems to produce the best decision that suits their needs. Dashboard technology is one of these technologies that have emerged to present important information in a simple and easy manner to guide organizations towards the right track.

Organizations deal with crises before they occur. Detecting early warning signals can predict the imminent crisis depending on the data and information available to the organization. Such information is derived from internal and external environment and connected to start planning and preparing for the prevention process, thus minimizing the effects of this crisis once it occurs and managing the situation to avoid losses that – in some cases – might lead to the collapse of the organization. Therefore, organizations resort to modern technological methods - e.g. dashboard - to effectively manage the course of work. These technologies are effective in presenting important data and information in the form of drawings and graphics or in a summarized manner.

Dashboard is one of the tools used by administration to support and confirm the decision-making process and pursue goals on all administrative and functional levels. Dashboard is produced in a form of a
Dashboard is an important application in the business world. It consists of tables and figures displaying a set of indicators that clearly provide information to managers in order to monitor the organization's activities (Hamani & Mary, 2013, 8). It is a tool of management control (Guni, Claudia n 0.2014) and a common element in performance measurement systems, management systems, and business performance management systems in general (BPM) (E. Aronson, Jay, 2007, 417). Dashboard is also a tool for business management. It serve as a visual representation of the organization (Rosso, 2014, 44). Dashboard provides a summery to the necessary information using a interactive graphical user interface (GUI) (Scheos, 2008, 92). It also focuses on a goal and offers the most relevant information on a digital screen. An effective dashboard uses pictorial techniques, such as colors, buttons, and graphs (G. Bremser & P. Wagner, 2014, 62). Swain Scheps has explained that Dashboard measures, monitors, and manages your business (Scheos, 2008, 97). The idea of Dashboard is similar to the picture that provides visualization of small lights on the control panel for each system requiring guidance and administration (Guni, 2014, 449). Business Dashboards can be used by anyone, with no need for a technology information team or even technological knowledge (Downes, 2015, 21).

There are three main uses of Dashboard, dubbed “Dashboard applications”. The study will use these applications to discover its impact on crisis management, namely, (observation, analysis, administration) (Eckerson, 2006):

1. **Monitoring**: Important information is quickly and duly transferred using relevant data accompanied by drawings. Zhang (2008, 3) has referred that the measurement of Dashboard efficiency is its ability to display information in a meaningful way to the beneficiary. Dashboard enables users to monitor performance metrics which integrates with the organization’s strategies (Eckerson, 2006)

2. **Analysis**: Users are allowed to analyze and explore performance data across multiple dimensions and at different levels to reach the main reason behind the problems faced by the organization. Hammargren and Simon (2009, 118) have pointed out that Dashboard do statistical and logical analysis for large groups of data, and search for patterns that can support decision-making. These are among the most important benefits that managers can obtain from Dashboard, as it enables them to analyze the performance indicators through one screen display, and thus make decisions and improve the performance of the organization (Bradea, Sabău-Popa 2104)

3. **Management**: Dashboard performance is usually guaranteed to help executives in steering the organization towards the right performance, strengthen and improve coordination between business units and task forces, and generates better communication between managers, analysts, and employees. These results occur through performance review, like regular strategic reviews, as well as daily and monthly operational reviews that can be addressed in meetings and direct reports.

For Dashboard to be a powerful and effective tool, it must provide the user with continuous monitoring of the change processes that allows for immediate intervention to achieve the ultimate goal. It should also present clear information on specific activities that (negatively or positively) contribute to in achieving goals and the ability to predict future outcomes based on the effectiveness of current initiatives so that pre-emptive decisions and measures are taken to change and influence in a positive way. (Vaccarezza & Gianluca, 2014, 47)

The development of Dashboard devices to measure performance has proven that this method is a worthwhile experience and a great tool for reports. It has provided the Board of Directors and senior management team with the opportunity to agree on what is really important for the organization to achieve its mission and discuss what needs to be improved (Manzetti & Mehta, 2015, 14). In the recent years, Dashboard has evolved to provide more advanced analytical purposes, including new features, such as scenario analysis and flexibility in presentation methods, due to the rapid development of business techniques (Yigitbasioglu and
Velcu, 2012). It is also considered one of the most important software to assist in decision-making (Arnott and Pervan, 2005). The creation of a successful Dashboard requires integrating different processes that confirm data accuracy, ease of use, and optimal performance, which in turns confirms the success of the Dashboard. A well-designed accurate Dashboard can communicate quickly with key business indicators and provide them with executable information (Calhoun & Srinivasan, 2012). Rasmussen, Nils & Chen (2009, 11) have suggested the existence of many benefits of dashboard:

First, improve the decision-making process and performance through the ability to easily identify and correct negative deviations, the ability to make studied decisions through the collection of business intelligence (BI), and the ability to measure the organization’s efficiency and effectiveness.

Second, achieve staff effectiveness through improved productivity, and reduce the time needed for the preparation of reports, thus reducing the need to create and sustain large numbers of periodic reports.

Third, motivate employees by providing Dashboard as a way to participate in the operational strategies, techniques, and data to enable staff to understand goals and make decisions correctly. Moreover, Dashboard must have a good design to attract the attention of workers better than traditional reports.

Crisis Management

The phenomenon of crisis is linked to a sense of danger & tension and the importance of the time needed to take decisions and actions. Crisis is a situation that needs to make an effort to identify variables, interpret phenomena, try to control events, and avoid risks. Dealing with such situation requires an insight into past events to determine the causes of the crisis and the conditions that brought it into existence. It also requires an open mind to understand all dimensions surrounding the crisis and a future vision to anticipate developments.

Crisis is defined as “A sudden event that cannot be brought under control and threatens the life of the organization and people – in some cases – leading to a positive or negative effects depending on how it is dealt with” (Thelwall & Stuart.2007). "A defect that materially affects the whole system and threatens the key assumptions underlying the system" (Gainey, Barbara S, 2009). Crisis is "A devastating event or series of events, which go beyond the enterprise’s capabilities, prevented it from achieving its tasks and affecting a large part of the organization" (smith, denis & Elliott, dominic, 2006). Others define it as "The perception or interaction of an unbearable event or situation that surpasses current resources and coping mechanisms" (James, Richard K & Gilliland, Burl E. 2005). It is also known as "an event or activity that adversely affects the reputation or credibility of the business" (Caponigro, jeffrey R, 2000). The concept of crisis management is defined as "The process by which warning signals are identified" (Yamamoto.G, Sekeroglu, 2011). It is also known as “Operations carried out by the organization to deal with unpredictable events that threaten and hurt the organization, the shareholders, or the general public (Najafbagy, Reza, 2011), and as "A strategy to prevent and respond during crises and adverse events plan. It’s a process that removes some of the risk and uncertainty and allows the organization to be at greater control of its own destiny." (Jasko, Ondrej, 2012). It can be said that crisis management is a special type of change management (Van Wart, Montgomery, 2011). Knowledge of the elements that contributed to the crisis contributes to tackling the crisis, while effective knowledge management helps predict the crises before they occur and draw policies to prevent or mitigate their effects (Wang, 2006),

The model presented by the (Mitroff, II 1994) is the most common and popular. It divides the stages of crisis management into five stages based on what are the most important tasks to be performed by the organization at a certain stage of the crisis, and the main tasks for each stage. This provides the organization with knowledge needed to perform this task successfully. The model has been highly popular among many researchers in this area, and it was applied on many studies, e.g.: (Alnoaash, 2006), (Khali Pole, 2006), (2009,
Signal Detection: This phase occurs before the crisis or before actual beginning of the crisis. This stage features the presence of some signals and indicators that warn of a crisis or the possibility of its occurrence. The organization should separates these warning signals from natural signals that appear daily in the processes within the organization. Every crisis sends its own signals, and it may be difficult to distinguish between the respective signals on each crisis.

Readiness\(^1\) (Preparation / Prevention): Most crises are preceded by warning signals. Scenarios to a possible crisis are drawn during this stage based on signals from the previous phase. The organization should have prepared methods adequate to prevent the crisis (Majid, 2008). In this stage, the organization should provide the necessary preparations for crises prevention, not to mention providing training programs to reduce the effects of the crisis when it occurs.

Containment / Damage Limitation: This phase begins at the time of the crisis, and features the implementation of the plans prepared to face it, deal with it, reduce its consequences, and reduce the generation of new crises.

Recovery: At this stage, the crisis begins to subside gradually, and the administration have recognized the dimensions and causes of the crisis, and can work to provide some realistic solutions and take the necessary measures to restore balance and operations.

Learning: A post-crisis stage where the management assesses plans and methods used before, during, and after the crisis, draw lessons and experiences to improve its capabilities to face and avoid similar crises in the future.

**Dashboard and crisis management**

Information technology in general and Dashboard is particularly are essential and important factors that influenced the discovery of crisis signals and preparation process (Peter, Salim, 2011). The use of this technology can save time and effort and speed up business during a crisis (Amar, 2005), and the provision of some of these technologies in the crisis is of high importance to manage the crisis effectively; because it brings multiple benefits, including: rapid response, overcome the lack of the time factor, risk, the lack of information so as not to prevent the explosion of the crisis, control the crisis with minimal losses, rationalize and coordinate the efforts exerted in dealing with the crisis, and ensure the validity of decision-making in a timely manner (Moroccan, Abdel-Hamid Abdel Fattah, 2002). Hayali (2011) has pointed to the role technology plays in the submission of appropriate information in a timely manner for managers to use during crises management.

Information technology and its continuous development are very important for contemporary organizations seeking excellence and competition with other organizations. Therefore, such organizations must invest its strategies, plans, and cutting-edge technology in the management of crises. Many researchers have pointed out the role of information technology in crisis management (Muhanna, 2004) (Moataz 0.2010) (Saleh, 2014):

- Enable organized information technology to predict crises by avoiding the element of surprise that might cause deficient knowledge and information about the crisis.
- Make information about necessary dimensions available to enable fast decision-making to overcome the negatives leading to crises
- IT readiness allow decision alternatives and choosing the best alternative to deal with various crises

\(^1\) The researchers adopted the term (Readiness) to express for (Prevention / Preparedness) stage.
- IT provides broader space for the decision-maker to positively deal with the causes of crises before they occur as a tool to quickly overcome them.
- IT enhances the potential of information and the capabilities of internal organizations to overcome internal and external obstacles and overcome crises fast and accurately.
- IT helps in acquiring a strategic stockpile of information that is relied on for predicting crises and overcome them before they occur.
- Avoid the element of surprise via the warnings offered by information technology, which refers to the possibility of a crisis.

**Importance of the Study**

The importance of the study stems from the importance of the subject being discussed. This subject is of academic and applied urgency, as it is the main concern of most organizations, especially at the present time, and with the economic, political, and social conditions and fluctuations. Our current global situation has led to increased interest in crisis management in research centers, universities, and all organizations all over the world. This subject requires concerted human and technological efforts to reduce the crises of all types. One of the technologies used to monitor the performance and business of organizations is Dashboard. This study is an attempt to provide added knowledge of the concept of crisis and Dashboard and its applications. The importance of the study lies in discovering the impact of Dashboard on detecting the early warning signals of the crises and preparing for prevention in Jordanian telecom companies.

**Study Problem**

Organizations’ need to strengthen their capacities and capabilities in dealing with crises have become an inevitable and frequent reality nowadays due to unstable business environment conditions, in addition to other environments, e.g. political, social, technological, etc. Exploitation of various technological methods may help in the discovery of crises before they occur, avoiding them, or prepping for them in order to mitigate the negative effects, hence the problem of the study lies in the answer to the following question:

"What is the impact of using Dashboard to detect early warning signals of crisis and readiness?"

**Figure 1: Study model**

![Study model diagram]
Researchers have relied on the two pre-crises stages: (Detection of early warning signals and preparation / prevention)

Hypotheses

H01: “There is no statistically significance effect at the significance level (P≤ 0.5) of Dashboard on the detection of early warning signals”

H02: “There is no statistically significance effect at the significance level (P≤0.5) of Dashboard on Readiness (preparation / prevention)”.

Study methodology:

A descriptive and analytical approach and the field study methodology have been adopted. The two approaches are used to collect data and information for the completion of this study, according to the following:

- Primary sources, which relied on data and information collected from the responses of the study’ using a questionnaire.
- Secondary sources, which relied on desktop scanning, literature, and previous studies on the subject of the study.

Study population:

The study population consisted of all managers and users of Dashboard in the two Jordanian cellular communications companies, Umnieh and Orange, with total of (84) employees. The study has adopted a comprehensive survey strategy for the users of this method. The designed questionnaire was distributed to all members of the study population. (78) Questionnaires were recovered and (66) were deemed valid for analysis after filtration. Therefore, recovered questionnaires that are suitable for the analysis accounted for 85% of the total valid questionnaires of the study.

Description of study variables

Table 1 shows the arithmetic means and standard deviations and the relative importance of the study variables:

<table>
<thead>
<tr>
<th>variables</th>
<th>dimension</th>
<th>Mean</th>
<th>SD</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>dashboard</td>
<td></td>
<td>3.834</td>
<td>.314</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>monitoring</td>
<td>3.848</td>
<td>.465</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>analyses</td>
<td>3.693</td>
<td>.592</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>management</td>
<td>3.962</td>
<td>.498</td>
<td>High</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>variables</th>
<th>dimension</th>
<th>Mean</th>
<th>SD</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signal Detection</td>
<td></td>
<td>4.136</td>
<td>0.598</td>
<td>High</td>
</tr>
<tr>
<td>Readiness</td>
<td></td>
<td>4.257</td>
<td>0.552</td>
<td>High</td>
</tr>
</tbody>
</table>

Table (1) shows that the Dashboard section (independent variable) is relatively important, as the arithmetic mean amounted to (3.834), and the standard deviation amounted to (0.314). The first dependant variable “Detection of early warning signals” is relatively important, as the arithmetic mean amounted to
and the standard deviation amounted to (0.598), while the second dependent variable “Readiness “Preparation / prevention” is relatively important, as the arithmetic mean amounted to (4.257) and the standard deviation amounted to (0.522).

**Testing hypotheses**

The hypotheses were tested using multiple linear regressions, and the results were as follows:

Testing the first hypothesis which states that there is no statistically significance effect at the significance level (P≤ 0.5) of Dashboard on the detection of early warning signals

Table (2) results of testing the first hypothesis

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>R</th>
<th>R²</th>
<th>F</th>
<th>Sig F</th>
<th>Regression coefficients</th>
<th>Statement</th>
<th>β</th>
<th>Standard error</th>
<th>Calculated T</th>
<th>Sig T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detection of early warning signals</td>
<td>.413</td>
<td>.170</td>
<td>4.239</td>
<td>.009</td>
<td>monitoring</td>
<td>.335</td>
<td>141</td>
<td>2.861</td>
<td>.006</td>
<td></td>
</tr>
<tr>
<td>analyses</td>
<td>.162</td>
<td>.118</td>
<td>1.381</td>
<td>.172</td>
<td>-.212</td>
<td>.126</td>
<td>-.200</td>
<td>.050</td>
<td>-.212</td>
<td></td>
</tr>
<tr>
<td>management</td>
<td>-.115</td>
<td>.149</td>
<td>-.989</td>
<td>.326</td>
<td>-.155</td>
<td>.099</td>
<td>-.145</td>
<td>.152</td>
<td>-.155</td>
<td></td>
</tr>
</tbody>
</table>

The effect is statistically significant at the level of (α ≤ 0.05)

Results of table (2) show that the impact of independent variables on dependent variable (detection of early warning signals) is a statistically significant effect, where the calculated F value is (4.238), and the level of significance is (Sig F = 0.009), which is less than 0.05, while the correlation coefficient (R = 0.413) refers to the positive relationship between independent variables and dependent variable. The value of the determination coefficient was (R² = 0.170), pointing out that 17% of the variation in the (detection of warning signals) can be explained by the variation in Dashboard.

The regression coefficient (β) refers to the direct impact of (monitoring), which has a significant effect. Calculated t values are statistically significant (Sig) and less than 0.05, while (management and analyses) did not have a significant effect, where the value of t was at the same level of significance as (Sig): greater than 0.05 when dashboard applications were studied combined. Therefore, we reject the first hypothesis and accept the alternative one, which states that: There is a statistically significance effect at the significance level (α ≤ 0.5) of Dashboard on the detection of early warning signals.

Testing the second hypothesis, this states: there is no statistically significance impact at the significance level (P≤0.5) of Dashboard on readiness (preparation / prevention).

Table (3) results of testing the second hypothesis

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>R</th>
<th>R²</th>
<th>F</th>
<th>Sig F</th>
<th>Regression coefficients</th>
<th>Statement</th>
<th>β</th>
<th>Standard error</th>
<th>Calculated T</th>
<th>Sig T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Readiness (Preparation /prevention)</td>
<td>.558</td>
<td>.312</td>
<td>9.356</td>
<td>0.000</td>
<td>-.212</td>
<td>.126</td>
<td>-.200</td>
<td>.050</td>
<td>-.212</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-.155</td>
<td>.099</td>
<td>-.145</td>
<td>.152</td>
<td>-.155</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.495</td>
<td>.118</td>
<td>4.634</td>
<td>0.000</td>
<td>.495</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The effect is statistically significant at the level of (α ≤ 0.05)
Results of table (3) show that the impact of independent variables on dependent variable readiness (preparation / prevention) is a statistically significant effect, where the calculated F value is (9.356), and the level of significance is (Sig F = 0.000), which is less than 0.05, while the correlation coefficient (R = 0.558) refers to the positive relationship between independent variables and dependent variable. The value of the determination coefficient was (R² = 0.312), pointing out that 17% of the variation in the (preparation / prevention) can be explained by the variation in Dashboard.

The regression coefficient (β) refers to the direct impact of (monitoring and management), which has a significant effect. Calculated t values are statistically significant (Sig) and less than 0.05, while (analyses) did not have a significant effect, where the value of t was at the same level of significance as (Sig): greater than 0.05 when dashboard applications were studied combined. Therefore, we reject the first hypothesis and accept the alternative one, which states that: There is no statistically significance effect at the significance level (P≤0.5) of Dashboard on preparation / prevention.

Conclusions

Although there is no one approach or way to deal with crises and risks; however, it can be said that Dashboard improves readiness for crises. It accomplishes this task by providing information about the various organizations activities in a timely, effective, and low-cost manner. It unites the efforts of staff towards required tasks, and therefore becomes more effective in crisis management and minimizing its effects. This is achieved by presenting important information in an easy and simplified manner to help management guide the organization in the right direction to achieve goals.

The use of Dashboard helps detecting early warning signals of crisis and contributes to preparing the organization by means of displaying information to the beneficiary in a meaningful manner, perform logical analysis of the data, unify managers’ efforts, and enable them to guide their organization in the right direction.

This conclusion was reached based on the following results: First, communication companies recognize the importance of using Dashboard. The level of importance was relatively high, and this shows that the surveyed companies are very interested in modern technology, especially in crises management and readiness (prevention / preparedness). Second, the overall impact of Dashboard in the detection of early warning signals, where it gives some signals and indicators for the possibility of a crisis. Third, the overall impact of Dashboard on preparation to prevent a crisis, where Dashboard helps to prevent any crisis, which may help communication companies to draw possible crisis scenarios based on information from Dashboard.

References:


Hamani, Maryam (2013): “Evaluation of the management of the monitoring system through Dashboard”, "Master thesis” Kasdi Merbah University, Faculty of economic and business sciences and management.


