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## **Decision support systems and strategic planning: information technology and SMEs' performance**

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Fotis Kitsios\* and Maria Kamariotou

Department of Applied Informatics,  
University of Macedonia,  
156 Egnatia Street, GR-546 36 Thessaloniki, Greece  
Email: kitsios@uom.gr  
Email: tm1367@uom.edu.gr  
\*Corresponding author

**Abstract:** The implementation of decision support systems (DSS) is considered crucial to sustain competitive advantage because the business environment is getting more and more turbulent. Especially, small-medium enterprises (SMEs) face challenges such as the lack of conscious planning, the lack of strategic decision making and sharing information and it is difficult to increase profitability. As effective strategic management and decision-making is necessary, strategic information systems planning (SISP) is used to collect information and to support the decision makers to formulate and implement the right strategy to develop DSS. Information systems (IS) executives concentrate on technical issues and ignore the strategic plans of DSS. The aim of this paper is to examine how SISP contributes to a greater extent of profitability in SMEs. Data was collected using questionnaires to IS executives in SMEs, particularly in North Greece. The results indicate that managers should focus on implementing Situational Analysis with greater meticulousness, so that they can implement Strategy Conception and Strategy Implementation Planning with greater agility rather than now. This paper not only expands the current knowledge regarding the significance of SISP but also it enables managers to make the process better.

**Keywords:** decision support systems; DSS; strategic management; business strategy; strategic information systems planning; SISP; firm performance.

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**Biographical notes:** Fotis Kitsios is an Assistant Professor in Business Strategy and Innovation Management at the Department of Applied Informatics, School of Information Sciences, University of Macedonia, Greece. He graduated from the Technical University of Crete with a Diploma in Production Engineering and Management Department. He went on with a Master's in Organisation and Management and a PhD in Strategic Innovation Management with a specialisation in services. He has consulted several SMEs and has also been involved in the implementation and coordination of national and European research projects. He also lectured at several universities in Greece and has jointly supervised numerous Masters and Diploma theses. He acts as reviewer for ten scientific journals and he is author of books, as well as of a significant number of research reports and papers in scientific journals and conference proceedings. His scientific research interests mainly focus on business strategy, service innovation management, change management and technology.

Maria Kamariotou is a Researcher Associate at the Department of Applied Informatics, School of Information Sciences, University of Macedonia, Greece. She graduated from the University of Macedonia with a degree in Applied Informatics Department. She then continued to her Master Program with a specialisation in E-Business and Innovation Technology. Her thesis entitled 'Strategic information systems planning and success in SMEs: dimensions and implications for its strategy effectiveness', describes and analyses a methodological approach regarding on the implementation of strategic information systems planning and its impact on firm performance in Greek SMEs. She is a member of the British Academy of Management and of the Hellenic Operational Research Society. Her scientific research interests mainly focus on strategic management and information systems.

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## 1 Introduction

As the current business environment is getting more and more complex and uncertain, businesses are obliged to deal with that environmental uncertainty. As a result, the use of information systems (IS) and strategic planning support this effort. Decision support systems (DSS) support business strategy, and accommodates decision making use management skills to gain competitive advantage (Zubovic et al., 2014). The integration between IS and strategic planning is known as strategic information systems planning (SISP).

In order to be businesses competitive and reduce complexity in decision making, they use technology for effective and timely decision making. Researchers have studied the efficiency and effectiveness of DSS (Alalwan, 2013). Thus, DSS are systems which aim to improve the decision making planning and the solving of problems and tasks.

SISP is a process which supports businesses to achieve strategic goals through the integration of business strategy and information technology (IT) (Kamariotou and Kitsios, 2017). Researchers have studied the process of SISP since 1970. SISP increases the innovation and the development of new products. Moreover, it reduces costs and it supports the enhancement of relationships with customers (Kamariotou and Kitsios, 2017; Ullah and Lai, 2013). Businesses can compete in a global market, meet consumer needs and reduce the product life cycles when they use IS. Researchers claim that the use of technology could be a source of sustainable competitive advantage only if the IS strategy will be aligned with business strategy (Kamariotou and Kitsios, 2017; Ullah and Lai, 2013).

The process of SISP involves five phases, named; strategic awareness, situation analysis, strategy conception, strategy formulation and strategy implementation planning. These phases are related with the DSS process and supports the decision making process. Firstly, managers identify business goals and they analyse business environment, so they can use DSS to make decisions based on previous scenarios or based on the criteria which DSS propose. Furthermore, they can select the most suitable alternative strategic

scenario to be implemented and after its implementation they can assess it with the support of DSS.

Previous researchers have examined the impact of these phases on SISP success in large firms. However, studies in SMEs which are the most significant part of each economy are limited (Newkirk et al., 2003). Other researchers have highlighted the positive relationship between SISP and firm performance but they are limited and they only refer to theoretical results (Lederer and Sethi, 1996).

Nowadays SMEs have been negatively influenced by financial crisis. In order to face this, SMEs are obliged to gather information for their environment. Furthermore, SMEs try to align their business and IT strategy in order to compete in the current uncertain environment to be innovative and increase their growth (Bourletidis and Triantafyllopoulos, 2014). The most significant challenges which SMEs face and lead to the failure of the alignment process are the lack of conscious planning, the lack of strategic decision making and sharing information (Rathnam et al., 2004). As SMEs aim to be competitive, and reduce complexity in decision making, they can use DSS for effective and timely decision making.

Previous researches in this field studied how IT boosts decision makers to make more efficient decisions. Specifically, previous surveys that concentrate on the benefits of using computer-based systems though surveys which focus on the use of DSS in strategic decision making are limited (Arnott and Pervan, 2008; Kamariotou and Kitsios, 2017, 2016; Kitsios and Kamariotou, 2016a, 2016b; Mohan and Ahlemann, 2013; Nguyen et al., 2015; Piccoli and Ives, 2005; Rerup Schlichter and Kraemmergaard, 2010; Wahyudin and Hasibuan, 2015).

In this view, the purpose of this paper is to indicate the SISP phases which when used in the development of DSS can increase firm's profitability. Specifically, the objective is to determine which phases contribute more and how they can be improved.

The structure of this paper is as following: after a brief introduction to this field, the next section includes the literature review in order to highlight the issues which are discussed in this paper. Section 3 describes the methodology, while Section 4 shows the results of the survey. Finally, Section 5 discusses the results and concludes the paper.

## **2 Literature review**

### *2.1 Methodology*

The methodology suggested by Webster and Watson (2002) was used in order to gather the relative papers. The steps of this methodology are; Searching, which contains the selection of keywords, databases, topics and timeframe of papers. The second step is Backward search, which involves searching of references of the papers and the last step is Forward search, which contains the searching of citations (Webster and Watson, 2002).

The databases which were used are Scopus, science direct, web of science and ABI/INFORM. The keywords which were used in order to search the relative papers were combinations of the following; SISP, phases, stages, models, success, innovation, firm performance, competitive advantage, IS strategy and business strategy alignment, DSS, change management.

Papers were only in English and were published in scientific journals or conferences, not in books. Having searched all databases, titles and abstracts of the relevant

publications were scanned and the citations and references of the residual articles were then studied. A total of 116 articles results consist the final sample.

When common articles from all databases were resulted, the search was completed. It was then that the critical mass of relevant literature sources was considered as having been collected.

Previous studies presented the stages of implementation process of DSS systems, based on the strategic framework aligning business strategy and IS' objectives. SISP is a process which contains specific phases; in order to maintain business strategy and objectives through the support of IS, in order to gain competitive advantage. The current environment is getting complex and IT is continually increasing. Businesses are obligated to reduce the time needed for the introduction of new products and services to the market and make decisions about them according to customers' needs. This is a crucial objective for businesses which aim to increase competitive advantage and satisfy customers. Businesses need to gather updated information about the market, their customers, the competitors and their internal environment, in order to make effective decisions and achieve their goals. As the process of SISP provides a method for managers to follow, while being supported by the development of DSS, businesses can make effective strategic decisions.

However, there are many challenges and barriers which complicate the successful implementation of SISP. These challenges are related to the understanding of the objectives, the cooperation in the sharing of information between those who are involved, the communication, the involvement, and the management support. Other barriers such as, incapacibilities to collect data about the internal and external environment and the lack of knowledge on the business are also important (Maharaj and Brown, 2015; Pai, 2006; Yang et al., 2013; Zubovic et al., 2014). DSS gather information which helps executives to improve communication, to redesign the organisational structure and its processes and to make decisions more rapidly. So, DSS support businesses to reduce the effects of the above challenges (Mithas et al., 2011; Yoo and Digman, 1987).

## *2.2 Strategic decision support systems*

Yoo and Digman (1987) suggested a DSS model for strategic management. This model includes four subsystems; environmental analysis subsystem, goal-setting subsystem, DSS and strategy operating subsystem. The first subsystem supports the gathering of information concerning inventory, production, R & D, marketing, industry, raw materials, human resources, financial resources, market, technology, economic conditions, government and culture. This information is necessary for forecasting and projecting both the external and internal business environment. This information is generated by the staff, customers, managers and consultants.

The second subsystem involves a model base in order to produce alternatives scenarios. One or more of them are selected according to business's objectives as well as the organisation's mission. The results of this subsystem can be used as an input in the strategy operating subsystem for reparative actions and future effectiveness (Yoo and Digman, 1987).

A DSS database, a DSS model base and application programs are involved in the decision support subsystem in order to help the flow of information within the system. The DSS database involves files of historical, managerial and environmental data as well

as files on various transactions. The DSS model base contains models which are helpful for the solution of strategic problems (Yoo and Digman, 1987).

The generated information will be evaluated by managers who will select the best choice, which will be developed in the next subsystem. They can also be categorised in external files if further processing is required. The user interface supports this process by providing a set of menus and question/ answer dialogues (Zviran, 1990). Once the problem is identified, mathematical models based on the problem are developed that help the development of alternate solutions. Then, the models which help the analysis of the alternatives. Next, the selection of the most appropriate alternative follows. Overall, several methods, models, theories and algorithms, such as intelligent analysis of data and the fuzzy theory are applied to develop and analyse the alternative decisions in DSS.

In the last subsystem the decision maker formulates, assesses and selects alternative strategies. Then, he implements the selected strategy, and evaluates it based on information generated by the decision support subsystem. This subsystem supports each phase of strategic management process (Yoo and Digman, 1987).

To summarise, once the problem is identified, mathematical models are developed in order to produce alternative scenarios for evaluation. Next, new models are created to analyse the alternatives. Finally, the selection of the most suitable alternative follows (Alyoubi, 2015).

### *2.3 SISP for DSS*

SISP has become an important planning process in businesses and a critical issue for IS management. Several factors have influenced the change of the role of IS in organisations in recent years. These factors concern the use of IS for competitive advantage, the diffusion of IS in businesses, the use of IS on businesses' daily operations and the growth of interorganisational systems. These changes lead businesses to develop strategic planning for IS in order to effectively achieve their goals in this uncertain and complex environment (Premkumar and King, 1991, 1994).

SISP has been defined as the ability to formulate the strategy of a business with the help of tools, techniques and methodologies which were used to support organisations in identifying potential opportunities to develop IS with greater competitiveness (Peppard and Ward, 2014). SISP has been considered as an integrated process which contains specific phases. These phases and the relevant activities are presented as follows.

Strategic Awareness is the first phase of the process. In this phase, the definition of key planning issues, planning goals, the development of the planning team and the support of top level managers are involved. The next phase is situation analysis. The analysis of current business systems, current organisational systems and current IS are involved. Also, this phase contains the analysis of both the current external and internal business environment as well as the current external IT environment (Brown, 2004, 2010; Kamariotou and Kitsios, 2017, 2016; Kitsios and Kamariotou, 2016a, 2016b; Maharaj and Brown, 2015; Mentzas, 1997; Mirchandani and Lederer, 2014; Newkirk and Lederer, 2006; Newkirk et al., 2008).

Then, strategy conception is the third phase of the process. In this phase, the team determines the most significant IS objectives, opportunities for improvement, alternative scenarios and it also evaluates the opportunities for improvement. Furthermore, the members of the team define high level IS strategies. The fourth phase is Strategy

Formulation. In this phase, managers select the most suitable scenario from the previous alternatives, according to their assessment and the new business processes and IT architectures. Next the evaluation of this scenario is followed according to its strategic and technological impact. Furthermore, in this phase, certain new projects and priorities for new projects are determined. Specific activities which are applied for the implementation of the selected scenario are also included in these projects.

Strategy Implementation Planning is the last phase of the process. This phase includes approaching the actions of change management and the assessment of strategic plan (Brown, 2004, 2010; Kamariotou and Kitsios, 2017, 2016; Kitsios and Kamariotou, 2016a, 2016b; Maharaj and Brown, 2015; Mentzas, 1997; Mirchandani and Lederer, 2014; Newkirk and Lederer, 2006; Newkirk et al., 2008). A matching among DSS subsystems and SISP phases is presented in Table 1.

**Table 1** DSS Subsystems and SISP phases

<i>DSS subsystems</i>	<i>SISP phases</i>	<i>Activities</i>
Environmental analysis subsystem	Strategic awareness	Definition of the problem Determination of key planning issues and objectives Participation of team Management support
Goal determining subsystem	Situation analysis	Analysis of current IS Analysis of current organisational systems Analysis of business environment Analysis of IT environment
Operating subsystem	Strategy conception	Definition of significant IT objectives and objectives for implementation Evaluation of alternatives scenarios
Decision support subsystem	Strategy formulation	Definition of new IT architectures, processes, projects and priorities
Strategic information planning subsystem	Strategy implementation planning	Definition of change management process and action plan Evaluation of the process

Based on previous analysis about DSS models and SISP phases, Table 1 matches each subsystem with the relevant SISP phases and activities. These phases are used by authors in the survey which follows.

#### *2.4 IT and strategic planning in SMEs*

In complex environments, SMEs tend to formalise processes using certain rules and procedures which support the limitation of environmental uncertainty. Formalisation supports the development of aspects which encourage communication among the individuals and sharing of new information. Also, they transform the generation of new ideas through the inflicted structures into real plans, enhancing the growth of innovation. As the environment is getting more and more complex, the need for innovation is

increasing if businesses are to be helped to be competitive so as to survive (Giannacourou et al., 2015).

In Europe SMEs consist of 75% of all businesses. Despite the fact that family businesses focus on business's long-term sustainability, they do not develop strategic planning (Siakas et al., 2013). Specifically, Greece is a country which has a great extent of SMEs rather than other countries in Europe and the majority of them have been negatively influenced by the financial crisis (Vassiliadis and Vassiliadis, 2014).

Almost 80% of businesses have been highly influenced by the financial crisis. So, more attention is needed to be paid to SMEs and how they realise and deal with the crisis. As SMEs play a significant role both in Greek and European competitive financial growth and as the world's economy is influenced by them because they constitute 97% of businesses all over the world, it seems that formal processes in SMEs increase firm performance. These processes concern strategic management and information handling and require the support of managers in order to pay attention to strategies, structures and processes.

As the current financial crisis has negatively affected plenty of activities of the family businesses, they have already acted in a new complex financial environment where uncertainty increases and the market characteristics completely change. Financial barriers, as well as the lack of technological, managerial and human capabilities may limit their ability to deal with the financial crisis (Bourletidis and Triantafyllopoulos, 2014). Moreover, the lack of strategic planning negatively influences this difficulty. Formal processes in SMEs that are related with strategic management and information handling help managers to focus on strategies, structures and processes that aim to enhance firm performance. In complex environments, businesses should develop formal processes using standardised rules and procedures which enhance the minimisation of environmental uncertainty and manage economic consistency. Formalisation supports the development of frameworks that require both communication among the individuals and sharing of new information. Moreover, it encourages the transformation of new ideas into real plans using flexible structures. In this way, the level of innovation in the organisation is increased (Giannacourou et al., 2015).

There is a lack of strategic planning and formal processes in SMEs and they use IS ineffectively because they cannot align business and IT strategy. Researches have thoroughly implemented in this research area so that managers could understand the relationship between strategic alignment and the business value of using IT. The results of these investigations show that researchers have determined the following types of alignment between business and IS strategy and structure. The first type presents business alignment between business strategy and structure. The second type concerns IS alignment and discusses issues such as alignment between IS strategy and structure. Finally, the third type is a cross-dimension alignment which involves either alignment between business structure and IS strategy either business strategy and IS structure. Researchers claim that the alignment between organisational perspectives such as strategy, structure, management processes, individual roles and skills with technology can help to increase value in businesses, IS effectiveness and business performance (Suh et al., 2013).

The accomplishment of a high degree alignment between IT and organisational objectives has been mentioned as one of the important issues for IS managers (Reich and Benbasat, 2000). In this view both the organisation and IT are consolidated, developing

services with the support of IT so that businesses could effectively achieve their goals. Strategic IT alignment is unique for each business because it includes business and IT knowledge that are unique resources for each business in order to help business to achieve its objectives, (Kearns and Lederer, 2003; Kitsios and Kamariotou, 2016c).

Researchers widely argue that the process of alignment is important for businesses for many reasons. First of all, alignment helps businesses to effectively identify the role of IT which efficiently helps the business to achieve its objectives. Second, another benefit is that alignment encourages businesses to improve both their business scope and their infrastructure by meliorating the relationship between business aspects and IT. Researchers claim that the present alignment models are mostly business-driven rather than IT-driven. As a result, researchers should mostly focus on IT in order to determine the most suitable way in which technology can support the organisation. Businesses require to know as well as to make their business strategy clear, so the use of IT can support this effort (Ullah and Lai, 2013).

Although the contribution of alignment methodologies has been mentioned, the following challenges incommode many businesses to align IT with business strategy. First, many decisions about IT are made by business executives who are not aware about IT. This obstacle leads to the organisation being misaligned. Another challenge concerns IT executives who are not aware about the business objectives and often cannot realise the needs of business decisions. Finally, business and IT executives are conflicted and they do not trust each other. This influences negatively their relationship and consequently the business competence (Ullah and Lai, 2013).

## *2.5 SISP and firm performance*

The findings of surveys which study the influence of SISP phases on success conclude that IS executives focused their efforts on the Strategic Conception phase. Although planners concentrate their efforts on this phase, they cannot determine the suitable alternative strategies. As a result, their efforts do not positively influence SISP success. So, they cannot achieve their objectives. The most common problems which have been affected the SISP process are the lack of involvement and the failure to apply strategic IS plans. Executives cannot be committed to the plan, consequently the members of the team have difficulties to implement the IS strategy. Moreover, results show that executives understand that the Implementation phase is difficult and significant, so they concentrate on this phase (Lederer and Sethi, 1991; Newkirk and Lederer, 2006; Newkirk et al., 2003; Zubovic et al., 2014).

Internet and IT applications can be used as a tool which supports the communication and information sharing between the individuals and increases their participation to the process (Andersen, 2001; Pai, 2006). Their involvement in the process is increased when managers support the process (Brown, 2010; King and Teo, 2000).

Findings from previous surveys indicate that many managers put too much efforts to SISP process while others too little. When managers invest too much efforts, the process could be confused, delayed or its implementation is prevented. When managers avoid investing too much time to the process, the implemented plans could be inefficient so the objectives could not be achieved. Consequently, the assessment of the process is significant because managers can reduce these unsatisfactory results.

Findings conclude that managers concentrate more on strategy conception and strategy implementation and they do not invest time on strategic awareness and situation

analysis and as a result the implemented plans are ineffective and unsuccessful and they do not meet the objectives (Brown, 2010; Newkirk and Lederer, 2006; Newkirk et al., 2003). Moreover, when managers concentrate on the implementation of the process, they may achieve shorter SISP horizons but the strategic goals cannot be met. Executives do not focus on what strategic objectives really concern and how they can increase value to the business because they invest time on the horizon of the project and on minimising its cost due to limited IT budget (Brown, 2010).

The results indicate that executives should pay attention to implementing Situational Analysis with greater meticulousness, so they can apply strategy conception and strategy implementation planning with greater agility rather than now. Planners should analyse their current business systems, organisational systems, IS, as well as business environment and external IT environment. If planners understand those elements they can improve the result of the planning process excluding the increased time and cost which the process is needed. When executives understand the environment, they can determine important IT objectives and opportunities for improvement, they can evaluate them in order to define high level IT strategies in their business' strategy conception (Mirchandani and Lederer, 2014; Zubovic et al., 2014).

The productiveness of internal processes is increased by the use of IT supporting the competitiveness of the organisation to secure rare resources and to operate as a modulator against changes. An information processing is necessary to high-light limiting coordination costs, increasing inner control, improving the productiveness of internal methods, minimising both costs of functions and costs of handling data. Finally, the use of IT helps the business to boost the relationship with customers by learning more about their needs. The use of IT help the business to reduce uncertainty as it is able to concentrate more on quickly changing consumer demands and reduce response times, increasing firm performance. As a result, customers are satisfied and conduce to the increase of firm performance. It also allows the business to develop differential products that customers need or to provide more efficient services when business offers their existing products (Fairbank et al., 2006).

After the analysis of previous surveys, this study examines the relationship between profitability and the SISP phases, strategic awareness, situation analysis, strategy conception, strategy formulation and strategy implementation. The aim of this survey is the association of two important topics whose relationship constitutes a challenge for further research.

Based on previous findings and regarding previous researchers who highlighted the effect of SISP on firm performance (Lederer and Sethi, 1996) the following hypotheses were indicated in order to be tested:

Strategic awareness should concentrate on the planning process on gaining appropriate knowledge about competitors, resources, customers and regulators. The understanding of that knowledge could be achieved through careful organising of the teams. Top management commitment provides greater organisational confidence and continued financial support for the process. Hence:

H1 Strategic awareness positively affects firm's profitability.

Situation analysis which focuses on the analysis of the business, organisation and IS, would produce better knowledge about the organisation's requirements. The analysis of external business and IT environments would help produce better knowledge about the

effect of change and provide a better foundation for the plan, making it more possible to produce better results. Hence:

H2 Situation analysis positively affects firm's profitability.

Strategy conception, with recognition and assessment of opportunities, would provide more realistic alternatives. Recognition of IT objectives would enable the organisation to align future IT and business objectives. Better alternatives and choices would support the plan produce better results. Hence:

H3 Strategy conception positively affects firm's profitability.

Strategy formulation includes the identification of the plan itself as far as processes, architectures, and projects. When the identification of the plan is careful, it would make it more possible to meet planning objectives. Better prioritisation would result in greater likelihood of implementation and greater chance of meeting objectives. Hence:

H4 Strategy formulation positively affects firm's profitability.

Finally, strategy implementation planning, with more attention to change management and a better action plan would be more possible to achieve good implementation. Better control would result in more of the plan being implemented and as a result better delivery of planning goals. Hence:

H5 Strategy implementation positively affects firm's profitability.

SISP is a formal process and SMEs can implement it to define IS strategy and apply the most suitable IS for their needs. This process encourages businesses to make decisions on the planning and the implementation of IS, analysing their re-sources considering both the environmental opportunities and the threats. Moreover, SISP involves all the factors and the activities which are shown above as the benefits of the formalisation. Mirchandani and Lederer (2014), investigated SISP phases and they discussed that as the environment becomes more complex, more Situational Analysis is required. The analysis of current business systems, organisational systems and IS, as well as current external, internal business environment and current external IT environment permit the organisation to determine problems and diagnose opportunities.

So, more research in the implementation of this process will highlight the phases that contribute more in the success of the process. This will enable managers to improve the activities of these phases and to be more effective.

### **3 Methodology**

A field survey was developed for IS executives. The instrument used five-point Likert-scales to operationalise two constructs: SISP phases and firm performance. The SISP process construct measured the extent to which the organisation conducted the five planning phases and their tasks. The success construct measured the extent to which the organisation increased the profitability. The questionnaire was based on previous surveys regarding SISP phases (Kamariotou and Kitsios, 2017, 2016; Kitsios and Kamariotou, 2016a, 2016b; Mentzas, 1997; Newkirk and Lederer, 2006; Newkirk et al., 2008) and firm performance (Cao and Schniederjans, 2004; King and Teo, 2000).

Four IS executives were asked to participate in a pilot test. Each one completed the survey and commented on the contents, length, and overall appearance of the instrument. A sample of IS executives in Thessaloniki was selected from the icap list. SMEs which provided contact details were selected as the appropriate sample of the survey. The survey was sent to 300 IS executives and a total of 55 returned the survey. Data analysis was implemented with Multiple Regression Analysis in order to test the hypotheses.

As SMEs have been negatively influenced by financial crisis, they try to align their business and IT strategy in order to compete in the current uncertain environment to be innovative and increase their growth (Bourletidis and Triantafyllopoulos, 2014). Despite the fact that family businesses focus on business's long-term sustainability, they do not develop strategic planning (Siakas et al., 2013). There is a lack of strategic planning and formal processes in SMEs and they use IS ineffectively because they cannot align business and IT strategy (Suh et al., 2013). Specifically, Greece is a country which has a great extent of SMEs rather than other countries in Europe and the majority of them have been negatively influenced by the financial crisis (Vassiliadis and Vassiliadis, 2014). So, it was emergent to collect data during the economic crisis in Greek SMEs in order to examine the effectiveness of formulating and implementing IT strategies for DSS.

#### 4 Results

The IS executive is typically seen as the most suitable person in the organisation to provide data regarding SISP activities and success as defined in this study (Newkirk et al., 2003). Respondents in this study were employed in a variety of industries, well educated, and experienced. 32.1% of them worked in agriculture and food, 14.3% in retail, 10.7% in construction and the rest in other industries. 40.5% had some postgraduate studies and 42.9% had a degree. They also had 16–25 years of IS experience. Tables 2–4 show further respondent breakdown by industry, education and IS experience.

**Table 2** Respondents' industry

<i>Primary business category</i>	<i>Respondents</i>
Agriculture and food	14
Business services	3
Chemicals, pharmaceuticals and plastics	4
Construction	9
IT, internet, R&D	2
Leisure and tourism	2
Metals, machinery and engineering	5
Minerals	1
Paper, printing, publishing	1
Retail and traders	7
Textiles, clothing, leather, watchmaking, jewellery	3
Transport and logistics	4
Total	55

**Table 3** Education level

<i>Education level</i>	<i>Respondents</i>
Two year college graduate	5
Four year college graduate	25
Post graduate degree	25
Total	55

**Table 4** Respondents' IS experience

<i>Years</i>	<i>Respondents</i>
0–5	7
6–15	19
16–25	23
26–35	6
Total	55

Table 5 and 6 show the IS employees and the IS budgets

**Table 5** IS employees

<i>Employees</i>	<i>Respondents</i>
0–5	51
6–10	4
11–20	0
21–30	0
31–40	0
41–50	0
>= 51	0
Total	55

**Table 6** IS budgets

<i>Employees</i>	<i>Respondents</i>
0–50.000 €	37
51.000–100.000 €	12
101.000–150.000 €	2
151.000–200.000 €	1
>= 201.000 €	3
Total	55

Table 7 presents the Cronbach's alpha results for the phases of SISP, each one with four or five tasks and the firm profitability which is the dependent variable. The internal consistency, calculated via Cronbach's alpha, ranged from 0.812 to 0.856, exceeding the minimally required 0.70 level (Newkirk et al., 2003; Pai, 2006).

**Table 7** Reliability statistics

<i>Constructs</i>		<i>Scale mean if item deleted</i>	<i>Scale variance if Item deleted</i>	<i>Corrected item-total correlation</i>	<i>Cronbach's alpha if Item deleted</i>
Strategic awareness	SP1	17,425	14,913	.642	.839
Situation analysis	SP2	17,547	14,898	.584	.852
Strategy conception	SP3	17,368	14,978	.733	.822
Strategy formulation	SP4	17,566	15,258	.660	.835
Strategy implementation	SP5	17,660	14,188	.778	.812
Firm performance	FP1	18,000	17,086	.536	.856

The hypothesised relationships presented in previous section were testing using multiple regression analysis. Table 8 summarises the hypothesis testing. Of the five hypotheses, two were supported. A discussion on the results related to the hypotheses follow.

**Table 8** Coefficients a

<i>Model</i>	<i>Unstandardised coefficients</i>		<i>Standardised coefficients</i>	<i>t</i>	<i>Sig.</i>	<i>Hypothesis</i>
	<i>B</i>	<i>Std. error</i>	<i>Beta</i>			
<i>Constant</i>	1.105	.305		3.620	.000	
SP1	.006	.084	.088	.076	.940	H1 (-)
SP2	.038	.072	.053	.524	.602	H2 (-)
SP3	.214	.105	.254	2.048	.043	H3 (+)
SP4	.265	.088	.324	3.022	.003	H4 (+)
SP5	.031	.106	.040	.292	.771	H5 (-)

This study first analysed the relationship between Strategic Awareness and firm's profitability. H1 found no support. As IS managers do not invest time on Strategic Awareness, they do not identify planning objectives and they are not committed. As a result this phase does not affect firm's profitability. Furthermore, Situation Analysis found no support (H2). Despite the fact that this phase is very important for IS executives in order to gather information about competitors, industry and customers, results show that they did not focus their attention on this phase (Newkirk and Lederer, 2006; Newkirk et al., 2003). So, this phase does not increase firm's profitability. As predicted by H3, Strategy Conception indicates a positive relationship with firm's profitability ( $\beta = 0.214$ ,  $p < 0.005$ ). Consequently, H3 is supported. In contrast, previous findings show that more strategy conception does not, apparently, contribute to a better set of alternatives to managers in order to choose (Newkirk and Lederer, 2006; Newkirk et al., 2003). Furthermore, H4 is supported since the Strategy Formulation has an important positive effect on firm's profitability ( $\beta = 0.265$ ,  $p < 0.005$ ). Finally, H5 found no support. The strategy implementation planning phase is especially interesting, because implementation is generally seen as the most crucial phase to success. Plans may be conceived and formulated but are seldom implemented. Unfortunately, the results of this survey show that managers do not implement their plans.

Previous findings conclude that managers concentrate more on strategy conception and strategy implementation and they do not invest time on strategic awareness and situation analysis, as a result the implemented plans are not effective, successful and they do not meet the objectives (Brown, 2010; Newkirk and Lederer, 2006; Newkirk et al., 2003). Moreover, when managers concentrate on the implementation of the process, shorter SISP horizons are achieved but the strategic goals cannot be met. Executives do not focus on strategic objectives that really concern them and on how they can increase value to the business because they invest time on the horizon of the project and on minimising its cost due to limited IT budget (Brown, 2010). The results indicate that executives should pay attention to implementing Situational Analysis with greater meticulousness, so they can apply Strategy Conception and Strategy Implementation Planning with greater agility rather than now. Planners should analyse their current business systems, organisational systems, IS, as well as business environment and external IT environment. If planners understand those elements they can improve the result of the planning process excluding the increased time and cost needed for the process. When executives understand the environment, they can determine important IT objectives and opportunities for improvement and they can evaluate them in order to define high level IT strategies in their business' strategy conception (Mirchandani and Lederer, 2014; Zubovic et al., 2014).

During the current turbulent environment, SMEs aim to gain competitive advantage using DSS. Results indicate that as SISP become more significant for SMEs, knowledge regarding the environment is required. IS an executive have to analyse technological environment in order to make more effective decisions when they formulate strategies for new DSS. However, different managerial groups have to be involved in the process, increasing understanding and sharing the use of information. As a result, the relationship between managers and IS executives can be important for the alignment and success of the strategic use. They should cooperate in order to increase the competitive advantage through the integration of business and IT plan. Knowledge sharing is a significant factor which influence the quality of SISP and alignment of business and IT strategies. IS an executive having to concentrate on strategic issues to increase competitive advantage (Newkirk et al., 2003; Pai, 2006).

## **5 Conclusions**

So far, few academic researchers have paid attention to the effect of SISP phases on firm performance. This paper examines the extent on which the phases of a formal process can be followed by IS executives and managers in order to plan and use the right IS and increase competitive advantage. The results of this survey indicate that they concentrate on Strategy Conception and Formulation, focusing on defining IT objectives and architectures. As a result, they might be planning inefficiently and ineffectively.

DSS support SMEs to limit their costs, to reduce product lifecycles, to develop products according to customer needs and to make internal processes more effective. IT without strategic direction does not increase value to SMEs. SMEs should determine and communicate their vision, mission, business strategy and goals in order to align them with strategy and goals of IS. Managers in SMEs should be aware of IT issues in order to make better decisions for their businesses. This is difficult to be achieved when managers are not young and educated about IT. Frequently, they make decisions without focusing

on the objectives of IS department and this can be an obstacle for SMEs profitability and competitiveness. Thus, a culture of innovation and supporting IT is required to increase SMEs benefits through the process of strategic alignment.

In order to develop sustainable performance in the current complex environment, SISP process is significant for businesses so as to support successful development and implementation of their DSS. Implementing SISP process is a difficult task. It is necessary that businesses have multiple planning aspects by fully understanding their goals and strategies and facing up to their various issues. To conduct SISP process successfully, it is essential be that phases which have a positive impact on the process be taken into consideration.

Findings show that CIOs do not concentrate on Strategic Awareness and Strategy Implementation phase. Also, problems have been created from the implementation of the process concerning the lack of managers' education, communication, participation and cooperation, alignment of business goals with DSS and the support of change. These factors have negatively affected the success of the process and the business performance. Future research should examine how managers could focus more on these phases and how they could limit the negative effects of these factors on SISP success and firm performance.

There are many benefits derived from the use of DSS. DSS support decisions in each phase of the decision making process. These systems provide information to managers in order to increase communication among individuals, to make more effective and rapid decisions and to redesign organisation's structure (Yoo and Digman, 1987). DSS help businesses to design new products and services according to customers' needs, to introduce them in the market more quickly and to decide which processes need to be redesigned, in order to maintain the results of their decisions (Kitsios and Kamariotou, 2016a, 2016b). These benefits derived from the use of DSS affect the SISP process, because businesses collect information which will make the process of the environmental analysis, the analysis of current systems, the formulation of objectives and the definition of the new business and IT processes easier to be handled.

The results of this study contribute to IS executives' awareness of the strategic use of IS planning in order to increase competitive advantage. Understanding those phases may help IS executives concentrate their efforts on organisations' objectives and recognise the greatest value of the planning process in their business. Second, the results of this survey can increase their awareness of the phases of SISP. IS executives should be knowledgeable about the five phases and they should not ignore the tasks of each one because this might be an obstacle which presents the organisation from achieving its planning goals and thus from realising greater value. Finally, the findings contribute to IS executives in Greek SMEs who do not concentrate on strategic planning during the development of DSS and they focus only on the technical issues. As a result, they should understand the significance of SISP process in order to formulate and implement IS strategy which will be aligned with business objectives and increase the profitability of SMEs. DSS help executives to make more efficient decisions but they should be strategically developed.

A limitation of this study stems from the fact that the sample was not adequate. Nevertheless, the results of an exploratory study will be summarised in an improved conceptual model for further research. Also, this survey is made for SMEs. Future researchers could examine and compare these results with relative ones from large

companies. Apparently, future researchers may use different methodologies for data analysis.

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