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An Adaptive Learning System Technology Advisor for the small business entrepreneur

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Introduction

Change is the only constant that is certain today. Managing a business in this constantly changing environment increases the complexity of making effective business decisions. Propelling this changing world is Information technology (IT). In this era, businesses are fueled by IT. Today, almost all business functions are entwined with IT. IT is viewed as an extension of business functions. This in part is responsible for the competitive climate that exists among businesses to adopt IT. It is heralded as the paradigm that can revolutionize the way we conduct businesses. IT promises a realization of positive benefits to businesses that were only dreamt of yesterday. The promises of IT are numerous and alluring: competitive and strategic advantages, status, increase productivity, automation of tedious tasks, reduction of errors, the internet and its global marketplace, business leveraging, a new technological savvy consumer, and decreasing cost of hardware. Those benefits are as magnetic to the small business entrepreneur as they are to their larger counterparts. Research documents that the use of IT within small business is steadily on the rise [Palvia, 1999]. Despite information technology’s attraction, IT implementation decisions pose some severe challenges. IT can be costly and risky. Small business entrepreneurs are extremely cognitive of that fact: an incorrect decision or lack of decision can have negative consequences. Small business entrepreneurs cannot afford the impact of a failed or incorrect IT implementation decision. The small business entrepreneur brings special properties to the table that can amplify their risks for making incorrect technological decisions. Some of these properties include limited budgets, lack of technological expertise, limited managerial staff, limited resources, time constraints, uncertainty of IT effectiveness, fear of relinquishing control to an outside consultant. At worst case, an incorrect decision or lack of decision can cost the small businessperson his entire company.

Nevertheless, successful implementation/use of IT within a small business can significantly create new opportunities and affect the bottomline of the business. The small business entrepreneur remains virtually unassisted in his/her challenging decision-making and control of IT. To minimize these risks, the entrepreneur must either have the expertise or tools must be developed that are small business entrepreneur-specific to assist/support his/her decision making. Research exists on IT issues, but few are tailored for the small businessperson. Ein-Dor and Segev, [1978]; Pollard et al., [1998]; and Palvia et al., [1999] research findings show that studies geared towards large businesses cannot be generalized to small business. A review of the literature demonstrates a lack of framework and/or tools that are focused on support for the small business entrepreneurs’ needs to successfully make IT implementation decisions.

The primary objective of this research is to evaluate the feasibility of an adaptive learning system technology advisor to assist the small businessperson in his decision making process of IT investments. Researchers and practitioners can use the results of this research, when completed, to develop tools to assist the small businessperson incorporate technology in his business. The birth of this research is based upon observations from practice, as well as reviews from research literature.

Importance of small businesses

There is an explosion of small businesses worldwide. In the United States this holds true. Small businesses are a vital part of the United States economy. More and more people are realizing their dream of business ownership. Small businesses account for the majority of businesses in the United States. As of 1996, they accounted for 99% of the 23.3 million nonfarm businesses within the United States. They also represented 51% of the private gross domestic product [Small Business Administration, Office of Advocacy, The Facts About Small Business, 1997; Small Business Answer card 1998].

By virtue of the contributions that small businesses make to the economy, it is important that they succeed. To this end, research is warranted on the impact of IT on small businesses. This research is geared to do just that. Throughout the research literature there are varying definitions for small business. It is therefore, paramount that this author defines what a small business is. For purposes of this current study a small business is defined as a business without a formal IS/IT department and has less than 100 employees.
Why does the entrepreneur need a technology Advisor?

There is a competing climate among businesses to adopt information technology. To the entrepreneur deciding to implement technology can be an extremely complicated and challenging task with consequences. Though, IT promises benefits, it is not without great risks [Atkinson, 1991]. Generally, a small businessperson has much more at stake than the larger companies. The small business entrepreneur risks financial ruin. The Small business association states that small business entrepreneurs seek outside funding for their business less than their larger counterparts for their businesses. In a small business there is usually a lack of large managerial staff- the entrepreneur is usually the decision-maker. He/She understands the factors that are critical to the survival of his/her business. Normally, the entrepreneur wears many hats. He/She is his/her own managerial team. When making complex decisions, which require support, the small businessperson may often find himself alone or dependent on outside help. Outside advice are suspect to the bias of the advisor. The small business entrepreneur needs to trust that his/her decision has net positive benefits to his/her business. Making informed decisions requires comprehensive knowledge of the perceived benefits and risks of the technology. This knowledge must be dispersed to the small business entrepreneur in the context of his/her preferences. Ultimately, the small business entrepreneur is responsible to make the decision in regard to embarking on such investment. Due to lack of expertise, the small business entrepreneur may not realize the full potential of IT for their business and thus make ineffective decisions about its uses within their organization. With such great risks, the small businessperson needs whatever support can help him/her improve the quality of decisions made in the successful implementation/use of IT.

What is success?

There are a variety of literature that specify ways for measuring the success of IT in business [Doll, 1988; Delone, 1988; Agarwal, 1994]. This author believes that success must be measured in terms of the extent IT assists the business in realizing or surpassing its business goals. IT must possess a business value to the businessperson in order to be considered a success. To evaluate the success of IT, a holistic view of the business and the environment within which it exists must be envisioned.

To truly realize the full potential of information technology for the small business entrepreneur research must be done to support the development of tools to assist him where he lacks expertise. The small business entrepreneur needs tools that can assist him/her acquire the knowledge that he/she lacks when making IT implementation decisions. This advice must be presented to the entrepreneur in a style that is tailored to his preferences: cognitive styles, competencies etc. The view that the small business entrepreneur craves the knowledge of net benefits of IT before making a decision to adopt is supported by Pollard, [1998]; Cragg et al., [1993].

Support tools

Expert systems, decision support systems and executive information systems all play significant roles in supporting the decision making process [Agarwal, 1994; Marakas, 1998; Sharma, 1998, Sullivan, 1989]. However, each of these paradigms, remains limited and lacks the flexibility to adapt to the various cognitive styles and preferences of the decision-maker as well as consider the changing environment that impacts effective decisions. To fully assist the small business entrepreneur with his/her complex decision process regarding IT implementation, tools that concentrate on the small business entrepreneur’s needs and preferences must be developed.

A decision support tool that overcomes the limitations of those existing paradigms and incorporates the businessperson needs and preferences will be advantageous for the decision-maker. This system has to adapt to various personnel and context choices, has to dispense advice autonomously based on user’s competency levels, continuous feedback, cognitive styles, and environmental changes while retaining the strengths of the existing support systems will be an invaluable support tool for the small businessperson in his decision making. A system that can incorporating the businessperson ideas in the model places the entrepreneur in a unique position of making IT implementation decisions, and retaining control of outside consultants. He/She now can feel a level of support and increased confidence about his/her decisions. A system that can learn from the user and render an appropriate level of support can be a lifelong asset to a small businessperson.

In fulfillment of this need this research proposes such a system: Adaptive Learning System Technology Advisor.

What is an Adaptive Learning System Technology Advisor (ALSTA)?

Conceptual model

This system utilizes artificial intelligence and combines the strengths of existing decision support technologies with intelligent systems to make a hybrid of an intelligent adaptive agent [El-Najdawi, 1993; Fazlollahi, 1997; Holsapple, 1993; Piramuthu, 1993]. The ALSTA will assist the entrepreneur in making effective decisions about IT. The system will be adaptable, nurturing and encouraging to the entrepreneur’s needs. It
will provide support for decisions over time. The dynamic adaptation characteristic of the ALSTA enables it to disperse expert advice at an appropriate level to the user. The proposed model for the adaptive learning system must have the following characteristics:

- assist in decision making
- must be dynamic: adapt support/advise autonomously
  - based on competency level of user
  - decision styles
  - environment
- learn from the user
- knowledge base
- give explanation for decisions
- always give decisions based on holistic view
- warn and engage the user when the user makes unreasonable requests
- tutor user
- cost effective
- easy to use
- customizable interface
- nurturing
- degrade gracefully

Basically, the system will become his trusted advisor: his ‘consultant in a can.’ It will provide the needed support and control that small business entrepreneurs lack in IT today. This system will be a small business entrepreneur centered project.

Is the ALSTA a feasible technology advisor?

In order for a system to be evaluated as feasible, it must pass several tests. According to Shelly et al. [1997] a feasibility study has three major yardsticks: operational, technical and economic.

This study will explore and prove the operational and technical feasible of the adaptive learning system technology advisor. This project will answer the following questions:

Operational:  Is the ALSTA a practical approach that will take advantage of opportunities and achieve the company’s goals?

Technical:  Are the necessary resources and people available for developing this project?

Evaluation

Once the Adaptive Learning System Technology Advisor (ALSTA) prototype is built, it must be evaluated for effectiveness. A selected group of technology experts will evaluate the soundness of the advice dispensed by the ALSTA. Once the ALSTA is deemed as a tool that dispenses effective advice a diverse group of small business entrepreneurs will be selected to use the program. The small business entrepreneurs will attest to the usefulness of the product both in terms of adaptability and effectiveness.

Conclusion and directions for further research

It is evident that small businesses play an important role in our economy. Information technology promises small businesses revolutionary ways of realizing their business functions. By ensuring that small businesses take advantages of the net benefits of IT, we are boosting our economy. Information technology for the small businessperson is not just a tool to automate tasks, it possess strategic and competitive advantages. It promises business leveraging. The Adaptive Learning System Technology advisor will assist small business entrepreneurs in reaping all the benefits that IT offers.

Research to enhance IT within small businesses needs to continue. There is a need for research customized towards exploring the strategic benefits of information technology for the small business entrepreneur. The results of this research can be used to develop tools and practices that the entrepreneur can use to take advantage of information technology.

My research interest continues to lie in ways to help the small businessperson successfully implement technology. My current research will continue by way of refinement of model and development of a prototype. Avenues for further research will be validation of my proposed model; examination of applicable user interfaces for the entrepreneur; review of machine learning technologies applicable for the adaptive learning system prototype.

“References available upon request from author”