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The Assessment of Tennessee Community College Roles
in Business Incubator Development, as Perceived by
Administrators and Incubator Tenants

A Dissertation
presented to
the Faculty of the Department of
Educational Leadership and Policy Analysis
East Tennessee State University

In Partial Fulfillment
of the Requirement for the Degree
Doctor in Education

by
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May 2001

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ABSTRACT

The Assessment of Tennessee Community College Roles in Business Incubator Development, as Perceived by Administrators and Incubator Tenants

As accountability pressures have increased on community colleges, they have been challenged to demonstrate their value to the communities they serve. One role commonly included in community colleges' mission statements in Tennessee and nationally is support of local economic development. The purpose of the study was to assess the importance and accomplishment of 17 activities and 3 roles of Tennessee community colleges regarding their support of business incubators that provide resource-sharing networks to entrepreneurs in their critical startup phases.

To conduct this study, a questionnaire was developed and provided to administrators associated with incubators and incubator tenants to ascertain their perceptions regarding community college support of Tennessee incubators. The questionnaire was administered state wide through the assistance of existing Tennessee business incubator directors. The population for this study was Tennessee administrators associated with the incubators and the incubator tenants. Ninety-seven questionnaires out of 156 were returned, for a 62% response rate.

The findings of the study included: (1) there was general agreement between administrators and tenants on their perceptions of the degrees of accomplishment and importance of community college activities supporting incubators; (2) there also was agreement between administrators and tenants that the importance exceeded the accomplishment of community colleges' business incubation activities and aggregative roles; and (3) no relationship existed between demographic and institutional factors and how the tenants and administrators perceived the importance and accomplishment of community colleges' business incubation activities and roles

Conclusions reached from this study were: (1) There was a need for increased community college efforts to support business incubation activities; and (2) demographic and institutional factors did not affect the overall perceptions of the importance and accomplishment of the community colleges' business incubation activities and roles.

Recommendations to improve Tennessee community colleges' practice included: (1) Administrative leaders at each community college should increase the time and money they devote to supporting their respective business incubator; and (2) each community college should use the assessment data from this study as a basis for a more detailed evaluation to develop or revise a strategic plan for business incubator support.

Recommendations for further research were to replicate this study in other states and for the entire nation. Using this and future studies, college administrators could target their community college services to better serve business incubator needs, thereby supporting the unique economic development activities in their respective service areas. As a consequence, the results of their revised strategic plans for incubator services could demonstrate how those community colleges' economic development efforts are being accountable to their missions.

DEDICATION

This study is dedicated to my wife, Diane, for her continuous love, support, and encouragement during my seven years in the doctoral program. Even when we went through personal disaster, after our home was destroyed by fire, Diane kept me focused on completing the doctoral program. Not only did she sacrifice her energy and time to rebuild our home without some of my vitally needed assistance, she was the "proof reader" for a seemingly endless assortment of studies, reports, and course projects. Diane has been not only the love of my life, but a true partner in all of my success.

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Last, but not least, special thanks are extended to my fellow ETSU classmate, Dr. Chris Lefler, for continuous guidance and friendship. In addition, thanks are given to other ETSU doctoral classmates (Dr. Elaine Boone, Dr. Jon Harr, Claire Stinson, and Carol Cole) who have given requested (often urgently) assistance without hesitance.

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CHAPTER 1

INTRODUCTION

The 1980s and the 1990s were challenging decades for community college administrators who addressed accountability issues. Community college missions generally reflected the external demands for institutional effectiveness within their service areas. In determining mission fulfillment in their respective service areas, the community stakeholders (private citizens, business and industry, and public agencies) began to demand the use of quantifiable indicators of effectiveness (Campion, 1995; Grossman & Duncan, 1989).

From the 1980s through the 1990s, community colleges have been charged with the responsibility of demonstrating measurable "value-added" indicators of community enhancement, especially in the area of economic development (Bogat, 1994, p. 68). In 1990, Allbright declared that "linking colleges to economic development is one of the most powerful movements operating in American higher education today" (p. 7). Verzello (1990) observed that, in state governments, "community colleges are considered primary participants in economic development" (p. 1). Community college administrators, understanding the increasing demand for measurable proof of the added value their colleges are contributing to their respective communities, have

sought more and better information. According to Katsinas (1994), between the early 1980s and 1990s, "perhaps no subject within the community college arena has sparked as much community colleges' interest" (p. 67) as the relationship of economic development to community colleges.

One measurable economic development indicator has been added by the creation of business incubators. Lalkaka and Bishop (1996) identified six quantifiable indicators (such as business and job creation), directly measuring the economic impact of business incubators. Incubators have provided an innovative approach for communities to "hatch" and sustain increased economic development. Through providing a "suite of services: office space and infrastructure, marketing, legal and financial advice" (Sims, 2000, August 4, p. 25) and a network of budding entrepreneurs in their critical start-up phases, incubators have demonstrated quantifiable economic development success. The National Business Incubator Association (NBIA) measured an 87% survival rate for businesses that "hatched" from incubators (Hayes, 1997) versus a 20% survival rate for start-up companies by the fifth year of operation (Kuehl & Lambing, 1995). For communities looking for measurable economic indicators, incubator graduates have continued to contribute to their communities with 84% remaining in the area after becoming established (Hayes, 1997).

Community colleges have been linked to incubators. Waddell (1990) documented that between 1987 and 1989 the number of community colleges that supported business incubators with a physical presence (offices, branches, or personnel) grew from 2 to 14. Incubators can offer tangible proof that community colleges have become catalysts for economic development (Katsinas & Lacey, 1990). Recognizing this positive impetus, several states have funded community college involvement with incubators. Illinois, California, Oregon, and Virginia have targeted funding to community colleges that manage or support incubators. In a 1998 Tennessee incubator feasibility study, institutions of higher learning were designated in Stacy's opinion as having a "very important" role in the incubation development process (Stacy, 1998, p. 17). According to Cleveland State Community College president Dr. Carl Hite, the incubator, located on his college campus, has become a "perfect fit of the college's economic development mission" (C. Hite, personal communication, August 3, 2000).

Statement of the Problem

Tennessee community colleges need to demonstrate their economic development contributions to the communities they serve. Some community colleges regularly assess their economic impacts on their communities. Schuyler (1997) maintained that

this type of study was expensive and might not address all the local critics' expectations. Support of local business incubators represents one possible avenue of a college's economic development approach and can be a relatively inexpensive way for the Tennessee community colleges to assess the effectiveness of their respective economic development efforts.

Few existing studies have shed much light on whether local economic development benefits have come as a result of community colleges' management or support of business incubators. Some studies (Esbeck, 1993; Grubb, Bell, Bragg, & Russman, 1997; Smith, 1996; Esbeck, 1993) have evaluated work training programs that have provided skilled employees for business and industry. Other studies (Smith, 2000; Young, 1997; Kapfer, 1988) have assessed the use of small business development centers at community colleges relative to their support of economic development.

Start-up companies in business incubators can benefit from support programs. Smith (2000) showed a strong correlation between business assistance services and the survival rate of new businesses "hatched" in incubators. None of those studies, however, has purported to examine the specific impact of the local community colleges on small business incubators.

Hernandez-Gantes (1995) reported that only 25 of the over 500 business incubators in the United States were sponsored or managed by community colleges. Even with the increasing popularity of incubation usage as an economic development tool, approximately 1,000 other community colleges were not directly involved in the business incubation process. Similarly, some Tennessee community colleges have been developing activities to support local incubators. By exploring the perceptions of accomplishment of possible college activities, the Tennessee community college impact on this economic development tool might be determined. Furthermore, through comparing the perceptions held by administrators associated with Tennessee business incubators to the perceptions of the incubator tenants, it may be possible to identify positive and negative attributes of current community college efforts and thereby suggest needed improvements.

Purpose of the Study

The purpose of the study was to assess the importance and accomplishment of 17 activities and 3 roles of Tennessee community colleges regarding their support of business incubators that provide resource-sharing networks to entrepreneurs in their critical startup phases.

Research Questions

In support of this purpose, the research questions and hypotheses to be addressed in this study were:

1. How well are local community colleges accomplishing activities related to business incubators?
2. Are there differences between administrators associated with business incubators and incubator tenants regarding their perceptions of how well the local community college is accomplishing the activities related to business incubation?
3. Are there differences between administrators and tenants in their perceptions of how well community colleges are accomplishing each of the 17 activities and the activities' importance?
4. Are there differences between the overall accomplishment roles for employment skill development, economic development, and incubator management and the overall importance of these roles?
5. What are the relationships between the personal factors of a) years in the position, b) years associated with the incubator, and c) age with each of the three overall accomplishment roles of employment skill development, economic development, and incubator management?
6. Are there differences in the personal factors of

- a) educational level and b) gender and the overall accomplishment roles of employment skill development, economic development, and incubator management?
7. Are there differences in the institutional factors of a) location and b) mission statement and the overall accomplishment roles of employment skill development, economic development, and incubator management?

Significance of the Study

Related literature revealed relatively little pertaining specifically to information about measuring community colleges' economic development impact through their contributions to business incubators. No evidence was found in the literature about the incubator tenants' perceptions of incubator accomplishment through the local community colleges, compared with administrators' perceptions regarding their incubator involvement. In addition, no evidence was found in the literature regarding the importance of the community college incubation activities to either the incubator tenants or the administrators associated with incubators. Through these comparisons the study could ascertain the perceived impact of community colleges that were instrumentally involved with business incubators.

Results of this research may provide community college leaders valuable information regarding their evaluation of their colleges' economic development efforts. To better meet the needs of local entrepreneurs, college administrators could target their community college services to better serve incubation activities and to adjust their economic development strategies in order to fit the unique economic situations in their respective service areas. As a consequence, revised strategies could increase both effectiveness and efficiency of community colleges in fulfilling their economic development missions.

Assumptions

1. Levels of perceived accomplishment are accurately measured by the survey instrument based on similar satisfaction instruments developed by Allbright (1990) and Chen (1995).
2. Suggestions of Tennessee administrators associated with incubators and Tennessee incubator tenants are appropriate indicators of suitable economic development efforts for each college's service area and/or for the aggregated service areas.

Limitations

1. Findings of this study were limited to the community colleges included in this study and should not be generalized to other institutions.
2. The study was limited to the extent that participants reported their feelings accurately on the survey instrument.
3. Information obtained about the levels of satisfaction concerning incubator support indicated only the perceptions of a selected group of administrators and incubator tenants. Other stakeholders in economic development might have different perceptions.
4. Results of this study should not be construed to represent the evaluation of the complete economic development impact of the colleges, or of the entire assessment of the satisfaction with the colleges by their respective business communities.

Definitions

For the purpose of this study, it is necessary to define terms associated with Tennessee community colleges and business incubators.

1. Administrators Associated with Incubators- Administrators employed by the local community college or the business incubator, selected by incubator directors as survey participants because of their link to the respective

incubators and community colleges. The selected administrators had multiple cross-functional duties between the college and the incubator. As examples, a small business development coordinator was employed by the community college and worked with incubator tenants and an incubator staff member coordinated college faculty for incubator workshops.

2. Business Incubator- A facility designed to nurture start-up businesses during the first two or three years of operations (Hayes, 1997). Through a bundling of a variety of services (such as office and/or manufacturing space and infrastructure, marketing, legal, and financial advice) at an economic or free rate to resident entrepreneurs, the start-up risks and development costs have been reduced (Sims, 2000, August 4).
3. Community College- "Any institution accredited to award the associate of arts, associate of science, or associate of applied science as its highest degree" (Cohen & Brawer, 1996, p.5).
4. Community College Mission- An organization's "core values and reason for being" (Draft, 1999, p. 133). Most community colleges missions have been shaped by commitments to teaching, lifelong learning, open access, comprehensive educational programs, and service to their communities (Vaughan, 1995).

5. Community College Role- A function assumed by the community college in support of its mission. In regard to business incubation, three roles (employment skill development, economic development, and incubator management) were selected for study. Community college activities contributing to a role were grouped under that role.
6. Incubator Tenant- An employer or employee of a start-up company located in a business incubator.
7. Quantifiable Indicators- Specific, measurable data selected to support the degree that a college was fulfilling its mission goals (Campion, 1995; Grossman & Duncan, 1989).

Overview

The literature indicates that community colleges are being held accountable for demonstrating the impact of activities supporting their economic development missions through quantifiable indicators. One avenue of providing such indicators is through the support of business incubators, as they report measurable economic facts (such as new business and job creations).

Chapter 1 provides a brief introduction of the community college increasing demand for measurable economic proof of the college's economic impact, the use of incubators for that proof,

and the relationship between community colleges and incubators. Chapter 1 also presents information concerning the purpose, research questions, significance, assumption, and limitations of the study.

Chapter 2 includes a review of past and current literature on community colleges' missions, economic development paradigm developments, and economic impact studies. Additionally, that chapter presents relevant information regarding business incubators and the economic linkage between business incubators and community colleges.

Chapter 3 explains the methods used to assess the role of Tennessee community colleges on business incubators. This chapter includes the methods and sources available for the collection and review of data and the statistical techniques used for the comparisons.

Chapter 4 includes the computational outcomes of the quantitative and qualitative analysis of the data collected from the survey instruments.

Chapter 5 includes a discussion of the findings associated with the analysis of the data of administrators associated with Tennessee business incubators and incubator tenants regarding the accomplishing and importance of community college roles related to business incubation. Conclusions and

recommendations for further research are also included in Chapter 5.

CHAPTER 2

REVIEW OF LITERATURE

Chapter 2 contains an overview of the literature concerning the relationships among economic development and community colleges' missions, business incubators, and community college uses of incubator support to help achieve economic development objectives. Specific subtopics discussed include the role of missions in community colleges, an acceleration of economic development initiatives by community colleges, the dynamic growth of business incubators as a means of increasing economic development, and the use of college economic impact studies to revise economic development strategies and objectives.

Community Colleges' Missions

The core of community colleges' purposes, structures, and goals has been described in their missions. A mission defines an organization's "core values and reason for being" (Draft, 1999, p. 133). Certo (1997) stated three reasons that missions are very important to organizations. First, a mission can help management focus its human resources in a common direction. Second, a mission can serve as the rationale or guidelines for resource allocation. Third, a mission can define

the critical job tasks that must be accomplished. Through publicized missions, community colleges have created a sense of meaning for their existence. Peters and Waterman (1982) emphasized the importance to the public of creating a sense of meaning: "We will surrender a great deal to institutions that give us a sense of meaning and, through it, a sense of security" (p. 78). For community colleges, missions have presented a proactive approach to respond to public pressures for accountability.

According to Vaughan (1995), most community college missions have been shaped by five commitments. These commitments included teaching, lifelong learning, open access, comprehensive educational programs and service to their communities. The particular pattern of allocating a community college's resources to fulfill specific community commitments has been as individualized as each community college's surrounding community.

Although the communities and respective community colleges have created unique missions, the notion that a college's sole responsibility could be satisfied through simply educating its community's incoming students has been altered as community colleges increasingly have concentrated their efforts on the overall institutional effectiveness in their respective service areas. Grossman and Duncan (1989) created a model of

institutional effectiveness as a guide for two-year colleges. Beginning with a model college's mission statement and resulting institutional goals, those authors determined indicators of measurable outcomes to measure the degree that a college was fulfilling its goals and therefore its mission commitments. Grossman and Duncan insisted on the use of quantifiable data to support these indicators. If appropriate indicators were satisfied, then the goals and the mission were inferred as being achieved.

Community college presidents, preferring more conventional indications of accomplishments (such as new buildings and enrollments), traditionally have avoided being pinned down by such data (Vaughan, 1986). In accordance with the model, however, community college administrators have been challenged to prove their colleges' institutional effectiveness by using facts and figures that can be collected and analyzed. For example, Central Florida Community College embraced "indicators of excellence" as a "pleasant approach to outcomes assessment" (Campion, 1995, p. 1). And it organized its approach to accountability under a general umbrella mission with 12 strategic goals and 48 quantifiable indicators.

Some use of quantifiable indicators has been criticized by community colleges and their reviewers and critics for not producing measurable "value-added" (Bogart, 1994, p. 68)

dimensions. Cohen and Brawer (1996) stressed the importance of values requiring excellence for community colleges. They contended that those values, centered on providing quality services to fulfill students' and community needs, were critical to fulfilling a community college's mission. They stated that a community college must add value to its community in order to serve the community effectively.

Economic Development Paradigm

Through their commitment to economic development, community colleges have been "pictured in a new kind of economic paradigm" (Parnell, 1990, p. 58), as partners with their business communities and these public communities to set and achieve quantifiable objectives in economic development. Ingram (in Tollefson, Garrett & Ingram, 1999) claimed that "virtually all state community college systems" have become involved in economic development efforts and "political leaders in many states have turned to individual community colleges to actively participate" in economic development efforts (p. 15).

In their model of institutional effectiveness, Grossman and Duncan (1989) categorized eight measurable indicators of a community college's institutional effectiveness in economic development, such as the number of jobs created as a result of the college's work with employers and the use of educational

services by business personnel to start, improve, or expand their businesses. Providing such proof of colleges' effectiveness has been an especially attractive objective for community colleges, being already measured or proactively preparing for such scrutiny. They have been emphasizing their community-based commitment and their adoption of the economic development paradigm. This paradigm has received much attention. Allbright (1990) declared that "Linking colleges to economic development is one of the most powerful movements operating in American higher education today." (p. 7) Zeiss (1994) concluded that for most community colleges, "their missions direct them to create partnerships with business and industry" (p. 28). In the 1980s and 1990s, according to Katsinas (1994, p. 67), "Perhaps no subject has sparked as much community colleges' interest. . . . Over 2,300 entries cross-indexed to the keywords *community colleges* and *economic development* in the ERIC database between 1982 and September, 1993."

In addition to community colleges' seeking quantifiable data to demonstrate their institutional effectiveness, another source of support for the economic development paradigm's predominance has been the increased effect of external influences on community colleges. Deegan and Tillery (1985), as well as Young (1997), labeled this shift from internal to

external control as the greatest single change that colleges faced in the 1980s and 1990s. The expanding list of external influences has included public funding agencies, state and federal lawmakers, and self-interest groups. Community colleges have become increasingly accountable to prove the effectiveness of their activities, such as economic development, to funding sources with "more than 40% of all states used performance measures in higher education budgeting" (Tollefson in Tollefson, Garrett, & Ingram, 1999, p. 29).

Calls for accountability from such external influences have caused the non-profit academic world of a community college to be viewed in some respects as a business (Schuyler, 1997). Schuyler further suggested that as a business, a community college should organize its factual support to fulfill accountability mandates through economic impact analysis. He maintained that analysis was linked to each college's unique mission and goals related to economic development; therefore, impact analysis could be related to the types of measurable indicators suggested by the Grossman and Duncan model. To fully justify its economic impact, the college must satisfy the external reviewers and critics to whom the college has become accountable. A format requested by such analysts can determine how the analysis has been constructed. Schuyler concluded that

the audience has increasingly become state policy makers, with their analysis focusing on justifying taxpayer spending.

When state policy makers have felt that community colleges needed a "push" in the direction of implementing economic development programs, state governments have mandated that community colleges support state policies in this area. Education incorporated (1988) reported that two statewide operations were formed and forced on respective community colleges. North Carolina sponsored customized industrial training throughout all of its community colleges. Ohio reported establishment of a unified technology center and six advanced technology application centers throughout the state on mandates to form partnerships involving all community colleges and nearby businesses. California's Economic Development Network was cited as the largest state community college system in regard to the number of centers for applied competitive technologies, international trade development, total quality management, and hazardous materials technology training (Hirshberg, 1991).

State funding in support of the community colleges' economic development commitment increased dramatically in the late 1980s and 1990s. Long (1989) mentioned two statewide funding programs. The state-mandated Illinois Community College Educational Development Center funded small business incubators

at 17 community colleges. In Oregon, a state network of 15 community colleges and three universities has shared state lottery monies designated for small business development. A review of the federal government's Integrated Postsecondary Education Data System (IPEDS) between 1988 and 1994 revealed state appropriations for workforce and economic development programs funding increases for Colorado (58%), Washington (51%), Texas (44%), Wisconsin (40%), Florida (28%), and Nebraska (20%) (Tollefson, 1998). For community colleges to follow the money and reap such financial benefits, they must assure state legislators that the colleges' missions, goals, and quality indicators have become prioritized in regard to economic development.

Rejecting the lure of funding, critics have warned of the undue influence of economic development programs in comparison with other mission commitments. These critics have been concerned about the possible deterioration of academic programs, especially transfer program (Deegan, 1989; Katsinas, 1994). Community colleges must maintain a delicate balance as they serve the needs of their communities. Perhaps, Sinclair Community College's motto, "Find the need and endeavor to meet it" (Grubb, Badway, Bell, Braggs, & Russman, 1997, p. vi), might be the best approach for community colleges to answer their

critics. Community economic development needs must be addressed, as well as traditional needs such as transferability.

How to satisfy such community needs has necessitated "the generation of the entrepreneurial college" (Deegan, 1994, p. 318). Entrepreneurial colleges have generated resources to satisfy external influences (for example, through establishing workforce development, specific industry training, and business support programs), and have received support from external sources (such as state economic grants and funding, corporate partnerships and contracts, and federal agency assistance). Entrepreneurial community colleges have come to be viewed by the external influences as "major players in the economic development of regions, states and the nation" (O'Banion, 1989, p. 12)

Recognizing the entrepreneurial need for community colleges to become major players and satisfy community economic development needs, the American Association of Community Colleges (AACC) has formed an associate organization named COMBASE (community-based community college programs). It has functioned as an umbrella source for community colleges seeking to improve their economic development efforts (Young, 1997). Other national idea-sharing groups also have developed, such as, the National Coalition of Advanced Technology Centers, a group of some 72 community colleges interested in technology transfer

for businesses, and NETWORK, a consortium of some 250 community colleges, all of which have been sharing program ideas for business and industry training, literacy and welfare-to-work programs (Katsinas, 1994).

States also have supported similar entrepreneurial sharing approaches. California developed a matching service catalyst, called the "Technology Exchange Center", located in Orange County, that linked businesses interested in or trying to implement new technologies with community colleges that could incorporate the desired technologies into their curricula (Melville & Chmura, 1991). Kansas and Wyoming community colleges established business and industry consortiums to identify and meet economic development needs (Esbeck, 1993). A consortium organized to deliver specialized training to small business owners and operators was developed in Maine. Other states that provided small business support through their community college systems include Arizona, Illinois, New Jersey, North Carolina, and Wisconsin (Ingram in Tollefson, Garrett, & Ingram, 1999).

As an entrepreneurial institution fulfilling its economic development mission, the community college must ". . . create conditions of economic and community well-being and demand for services, rather than simply being a response to the demand for educational programs" (Grubb et al., 1997, p. v).

Pappas (1993) insisted that community colleges had matured into being "ideally suited to become one-stop shops for economic development" (p. 10). The paradigm shift of a "synergistic" (Phelan, 1994, p. 607) partnership of community colleges with external business and industry representatives throughout the state was embraced by Zeiss (1994) as a "marvelous opportunity" (p. 510) with ". . . literally thousands of client-centered college-business partnership success stories" (p. 515). "In virtually all states, community colleges have established or strengthened relationships with businesses and industries" (Ingram in Tollefson, Garrett, & Ingram, 1999, p. 17). O'Banion (1989) considered such alliances as providing community colleges with "their most successful innovations in the late 1980s" (p. 11). Clearly, an enthusiastic and documented priority for community colleges to adopt the economic development paradigm was developed.

The Business Incubator Concept

The business incubator has been designed as an economic development tool to counter the high failure rates of most types of small start-up businesses. According to the Small Business Administration, only 20% of start-up companies were still in existence by the fifth year of operation (Kuehl & Lambing, 1995). The National Incubator Association found a national

five-year 87% survival rate for businesses that had "graduated" from incubators (Hayes, 1997). The design of incubator facilities typically has focused on two broad objectives. First, they have been packaged to have optimum impact on local community objectives. This means the incubator promotes the types of emerging technologies that would complement existing businesses. For example, an effort might be made to attract high technology businesses to an agricultural community. "Highly flexible incubators succeed in urban, suburban and rural settings, where they assist in developing a wide variety of small businesses that create jobs and revenues for their regions (Harper, Bislason, Livingston, & Liske, 2000, February, p. 2). Second, they have attempted to solve the needs of entrepreneurs by coordinating services and financial resources and by reducing business start-up risks and development costs. "Incubators offer young companies a suit of services: office space and infrastructure, marketing, legal, and financial advice—things that start-ups need, but don't usually have" (Sims, 2000, August 4, p. 25). In addition, incubators draw businesses outside of the area to cities with incubators (Pare, 2000, March 12). Incubator managers have used their specific knowledge to assist local entrepreneurs. They have designed the incubators to nurture business start-ups during the first two or three years

of operation--"critical times that make or break any entrepreneur" (Hayes, 1997, p. 12).

Incubator objectives have been as diverse as the communities themselves. In one location, the incubator managers provided everything from consulting services to office space and clerical services, to assistance in locating capital resources in another location the core of the incubator is a shared commercial kitchen or arts and craft display center. Physical structures have varied from a new building in Nashville to a renovated historical structure in Chattanooga, to a system of networked hubs, in Mobile. Dinah Adkins, executive director of the National Business Incubator Association (NBIA), stressed that above all else an incubator must have a "comprehensive start-up program not just a building. Bricks and mortar have been the least important aspect" of incubation development (Adkins, 2000, July 23). The survival rate of new businesses in incubators has shown a strong correlation to business assistance services (Smith, 2000).

Public funding has been a critical component of incubation success. Almost half (about 49%) of the incubators have relied on some form of local, state, or national public funding, according to the National Business Incubator Association (NBIA) (Hayes, 1997). This public investment has paid off. The return on public investments for incubators

receiving public operating subsidies in terms of tax revenues reportedly was \$4.96 for every \$1 of such support (Molnar, Grimes, Edelstein, DePietro, Sherman, Adkins, & Tornatzky, 1997, August).

Incubators have offered innovative approaches to economic development. As a support mechanism for small businesses, which have recently been credited with creating two out of every three new jobs in the United States, "business incubation is clearly an idea whose time has come" (Fenner, 1999, November 12, p. 4). For communities striving to strengthen their economic status, they have recruited new firms from outside their areas, helped existing business and industrial organizations to survive and flourish, or created local initiatives for new businesses. According to the NBIA, 84% of the firms that had "graduated" from business incubators remained in their communities for the organization's duration, improving those communities' economic situations (Hayes, 1997). One author said that incubators have provided a "win-win situation" (Davis, 1999, p. 47), both for the entrepreneur, who finds a haven in which to network and grow, and for the community that has been searching for stable, new and permanent economic growth.

The United States incubator movement reportedly has grown from two facilities in 1980 to over 600 in 1999, and then

has exploded to about 800 by the year 2000 (Pare, 2000, March 12). Prior to 2000, incubators have generated over 19,000 companies that are still in business and over 240,000 jobs (Davis, 1999). In an era when large corporations have been downsizing, rightsizing, and reengineering, displaced professionals with proven track records of success have been flocking to the incubators.

Recognizing the importance of incubators in economic development, national public agencies have responded positively. The Economic Development Agency (EDA) and the Appalachian Regional Commission (ARC) have provided funding for incubators. For example, EDA requested grant proposals specifically designed for small business incubation (Federal Register, June 11, 1996) and ARC funded a cooperative effort with the National Business Incubator Association to identify "best practices across the nation" and establish "an information network to strengthen business incubators in Appalachia" (EntreNews & Views, August 1998, p. 1).

Witnessing such national success, Tennessee's public agencies' interests have grown. As an example, in 1995, the Tennessee Development District Association commissioned a Tennessee statewide incubator network study. Its purpose was to "judge the critical mass resources" of each Tennessee county; "sample leadership attitudes and knowledge" of the business

incubators, and "examine existing programs and trends to define" where programs could be logically placed (Stacy and associates, 1995, p. 3).

The Tennessee Incubator Network study concluded that there were 15 counties that possessed the necessary "critical mass" to "launch and sustain" (Stacy, 1995, p. 83) business incubators within their boundaries, and 11 counties that were very near critical mass capability. Critical mass factors used in the study included population trends, economic activity (such as start-up activities, banking assets, retail trade trends, and employment trends); technical core (attorneys, accountants, and engineers); educational institutions (technical institutes and four-year and two-year colleges); small business support (chambers of commerce; industrial development authorities; and small business development centers); and the leadership attitudes of the county.

Partly based on this positive study, Tennessee public agencies have increased their emphasis on supporting the business incubator concept. Statewide, the Tennessee Valley Authority and the Tennessee Department of Economic and Community Development co-sponsored the establishment of Business Incubation Managers Association of Tennessee, Inc. (BIMAT). This nonprofit corporation's purpose has been to promote the marketing of the incubation concept and the establishment and

operation of business incubation networks. On March 3, 1998, BIAMT sponsored a one-day training session in the Northeast Tennessee Tri-City area (Johnson City, Bristol, and Kingsport). This conference drew 44 participants from 4 states (Kentucky, Virginia, Tennessee, and North Carolina) and reflected incubation enthusiasm in the northeast Tennessee area. Nationally, as well as in Tennessee, the business incubator concept has been accepted as a viable economic development initiative and efforts have been developed to fully use this tool.

Community Colleges and Incubators

As mentioned, community colleges increasingly have established economic development policies. Such policies can be implemented through both traditional and nontraditional initiatives. Traditional economic development initiatives have been largely ". . . subsumed in vocational-technical as well as remedial functions", and nontraditional efforts have provided "community services functions" (Katsinas, 1994, p. 69). Technical training is an example of a traditional type of initiative, and a small business incubator is an example of a nontraditional initiative.

This nontraditional approach has complemented community colleges' partnerships with business, industry, and public

agencies in accordance with the economic development paradigm of an entrepreneurial college. Its role may be either "coordinative or supportive", acting as a "college-community liaison and catalyst" (Young, 1973, p. 124). Twenty-four years later, Young (1997) reasserted that "Community college administrators would be well served to develop close relationships with state and local officials and corporate and civic leaders...to assume the role of a broker of services between business owners and public assisted programs and resource areas" (p. 82). Deegan (1994) insisted that for community colleges to sustain such an entrepreneurial role, each college must maintain a "proper climate" (p. 322) that was conducive to recognizing and supporting economic partnership opportunities.

In the 1980s, community colleges began recognizing the benefits of serving as catalysts for business incubation as a valid, nontraditional approach to fulfilling their economic development missions. Waddell (1990) found that in 1987 two community colleges were identified by the National Business Incubator Association as having a physical incubator presence, and two years later 14 had incubators. Physically, the colleges formed incubators either on campus (in new or unused facilities) or leased buildings off campus.

Katsinas and Lacey (1990) observed that through business incubation, community colleges could be catalysts as well as providers. In Illinois, over a five-year period in the 1980s, 14 community college business centers helped establish incubators. North Arkansas Community College, affiliated with the North Arkansas Business Incubator System, provided incubator services to small manufacturing companies and start-ups in a 15-county area (Waddell, 1990).

In the 1990s, Stacy (1998) stated that institutions of higher learning had exercised a "very important" (p. 17) role in the incubator's entrepreneurial development process. Not only did community colleges offer relevant credit and non-credit courses, but their libraries provided a basis for practical business research. Their traditional offering of job and skills training could support the incubator process and, nontraditionally, a "great deal of reasonably priced consulting assistance is available from faculty members" (Stacy, p. 17). From the 1980s into the 21st century, colleges have "plan to use their incubators to spark economic development and to solidify their ties to the local business community" (Van Der Werf & Blumenstyk, 2001, p. A28).

In Tennessee, Chattanooga State Community College has a consulting site at the Business Development Center, the Chattanooga Incubator, with 58 companies. Cleveland State

Community College has donated an underused building for an incubator with financial support from city, county, and federal funding totaling \$735,000. This 27,000-square-foot business incubator was opened on the college campus in April 2000, with already half of its spaces occupied (Bradley Weekly, 2000, April 15). Cleveland State Community College president Carl Hite stated that the business incubator project on his campus was supported by its facilities, instructors, small business development center, and administration. According to Hite, the incubator has become a "perfect fit of the college's economic development mission" (C. Hite, personal communication, August 3, 2000). Northeast State Technical Community College facilitated the formation of the Tri-City Regional Incubator, a non-profit corporation, that has been developing an incubator network for northeast Tennessee. In neighboring Virginia, the Mountain Empire Regional Business Incubator, opened for business in 1999, was formed through a partnership between several government agencies and Mountain Empire Community College, which has a representative serving on the incubator's advisory board.

Economic Impact Studies

As mentioned earlier, the call for accountability has encouraged community colleges to assess their economic development impact. Schuyler (1997) provided quantifiable

examples and models of such assessments. Young (1997) suggested using existing economic activity databases, as maintained by the U.S. Department of Commerce, to form a shared information system of community college contribution. Studies identifying and documenting such contributions could factually list community colleges' impact on economic development. Ryan (1993) supported the assertion that community colleges have been partners in economic development by describing a host of economic development programs at community colleges. Katsinas and Lacey (1990) listed common factors that appeared to lead to community colleges' success in nontraditional economic development activities.

Specifically regarding the nontraditional approach of business incubation, a 1995 study by Hernandez-Gantes found that only 25 of the over 500 incubators in the United States were sponsored or managed by community colleges. Community colleges that sponsored incubators ". . . appear to be providing primarily commercial space at low cost and clerical support to entrepreneurs, rather than consulting services and strategies aimed at fostering entrepreneurship" (Hernandez-Gantes, 1995, p. 16). Hernandez-Gantes also found that two-year community college faculty and staff were "not involved in education and training activities in comparison to university faculty who contribute to a greater extent in these activities"

(p. 17).

State studies on the economic development impact of community colleges have employed various methods, but have not assessed specific business incubation programs. Creating a statewide database of products and services of companies throughout Iowa was one recommendation from an impact study (Kapfer, 1988). This study recognized that Iowa ranked "49th nationally in total employment growth" (p.3) and suggested that community colleges could assist growth through the database program and local small business development centers. Using four Oregon community colleges and their respective small business development centers, Bombardier (1992) developed a case-study approach to assess college personnel's strategic change in response to environmental events. He analyzed such changes in colleges' small business development centers through interviewing center employees.

Smith (1996) explored the relationship between North Carolina community colleges' economic development mission and quantitative economic development measures. Smith tracked the relationship between economic development outcome variables and community colleges' characteristics, as well as their regional demographic and social characteristics. Outcome measures of economic development included total employment, earnings by county of residence, earnings by county of employment, and

poverty compared to participation and availability of colleges' education and training targeted to improving community members' job skills. Smith (1996) provided ". . . strong findings that occupational and transfer education (offered by North Carolina community colleges) related directly and positively to jobs and earnings" (p. 169). Unlike other state studies of small business development centers operated by or located on community college campuses, this study did not examine the aspect of a community college's efforts to satisfy its economic development commitment.

Allbright (1990) examined the role of Idaho community colleges in economic development, as perceived by three groups: community college administrators, community college teachers, and business and industry representatives. Allbright concluded that all three groups ". . . strongly agreed that the current role of community colleges in economic development should include employment skill development" (p. 82). Allbright recommended that each college should establish an economic development plan, a business and industry advisory committee, a public relations/educational training program for economic development activities, and programs to meet the needs of business and industry. Allbright also recommended upgrading in-service faculty training with the needs of new and existing business and industry and creating innovative training programs

developed between college educators and business and industry leaders.

Chen (1995) used the perceived satisfaction approach to assess economic development strategies used by community colleges in Maryland, South Carolina, and Virginia. Levels of satisfaction were compared between community college administrators and local stakeholders in economic development. Stakeholders included chairpersons of county commissioners, executive directors and presidents of chambers of commerce, and senior company administrators responsible for employee training from the largest local businesses in each of the surveyed counties. Chen concluded that "Community college administrators perceived higher levels of use and satisfaction with these (existing respective community colleges') strategies than do local stakeholders" (p. 108).

Summary

Great interest has been developed in linkages between community colleges' missions and the colleges' economic development commitments. To ascertain the degree to which those commitments have been fulfilled, external influences, (especially state agencies) have been seeking quantifiable proof. Business incubators can be one avenue for providing tangible economic development results. Although only 25 of over

1,000 community colleges have sponsored or managed incubators, the economic development data from those efforts have demonstrated positive results from community college training and consulting. Such data could be useful to other community colleges as they explore this possible economic development effort. Statewide studies of stakeholders, community college administrators, and instructors have been used to suggest adjustments of colleges' objectives that support their missions. Allbright (1990) and Chen (1995) have used state community college studies in Idaho, Maryland, South Carolina, and Virginia to reach conclusions on those state institutions' meeting their objectives. An examination of community colleges' economic development initiatives through perceived participants and administrators of Tennessee incubators sponsored and/or managed by community colleges could yield useful information for one viable economic development approach for community colleges.

CHAPTER 3

METHODS AND PROCEDURES

Introduction

The purpose of this chapter is to describe the methods and procedures that were used to collect and analyze data about perceptions of Tennessee business incubators by their community college stakeholders. The perceptions of administrators associated with incubators and the incubator tenants' perceptions of the colleges' accomplishments at Tennessee business incubators were compared. This chapter includes a description of the research design, the population studied, the instrumentation used, the methods of data collection and analysis employed, and the pilot study.

Research Design

A quantitative research design using correlation analysis (Pearson's Product-moment Correlation Coefficient, Analysis of Variance, t-test, and Chi-square Test) was the major focus used in this study. There was also a qualitative component targeted at identifying possible relationship enhancements between the community colleges and business incubators.

Specific quantitative research design and statistical analysis were based on the surveyor's experience and two dissertation approaches. Allbright's 1990 study of the role of community colleges in economic development was one approach. Allbright compared the views toward economic development by community college administrators, community college teachers, and business and industry representatives (Allbright). The second approach was based on Chen's 1995 study of factors associated with community college administrators' and local stakeholders' perceived satisfaction with the economic development strategies used by community colleges in Maryland, South Carolina, and Virginia (Chen).

Population

Tennessee incubator tenants and administrators whose duties are related to incubator functions were contacted for their involvement in this statewide study. The Business Incubation Managers Association of Tennessee, Inc. (BIMAT) provided lists of the Tennessee incubators and the incubator directors identified the local community college. I visited each of the six Tennessee incubators. After discussion with the incubator directors, community college administrators linked to each incubator, as well as incubator staff members, were determined. Often there were multiple cross-functional duties

between administrators of the community colleges and incubators. For example, a small business development coordinator was employed by the community college and worked with incubator tenants. All the incubator administrators and community college administrators with an incubator connection were added to the pool of potential survey respondents.

At the time of this study, six active incubator sites existed in Tennessee. Five incubator sites fully participated and the administration of one site of 19 tenants did not adequately respond. After months of requests only 2 tenant responses were faxed for review. Therefore, this site was not included in the survey analysis. The total number of tenants that responded was 76 and the total number of administrators was 23. This participation represented a 62% overall response rate.

Instrumentation

The purpose of this study was to examine the overall role of local community colleges in existing Tennessee business incubation development as perceived by administrators associated with business incubators compared to the perception of incubator tenants. A mailed or physically delivered questionnaire (Appendix A) was used to gather data from the administrators and the tenants.

In Chen's study, 18 economic development strategies were identified in the questionnaire that was used to determine the most extensively used strategy. That strategy was to offer business-related seminars and workshops. Chen recorded a 94.4% positive approval rating with this strategy. From the results of the survey the least widely used strategy offered on the questionnaire, maintaining a business incubator program, resulted in an 18.9% positive approval rating (Chen, 1995). Support of business incubators, as an economic development strategy, was chosen to be the focus of this current study of Tennessee community colleges and business incubators.

In Allbright's study (1990), the questionnaire had two components: community service and employment skill development. A panel of seven experts, all of whom were involved in Idaho economic development activities, reviewed the questionnaire statements. Responses and analysis of a pilot study and a random sampling of local community college administrators and teachers, and business and industry representatives were used to finalize the format and topics for the questionnaire.

The incubator questionnaire contained two sections. The first section of the instrument was used to evaluate demographic data. The demographic items for each respondent included positions in the incubator administration, local community college, or incubator tenant company, the number of years in

present position, the number of years associated with the incubator, level of formal education, age, and gender. The second section asked respondents to indicate the degree of their satisfaction with community colleges' support of the incubator activities. A five-point Likert scale was used to record the respondents' satisfaction levels (1 = very low, 2 = low, 3 = moderate, 4 = high, and 5 = very high and NO, no opinion. For the purpose of this dissertation, survey responses based on that Likert scale were treated as interval data. The visual arrangement of the numbers on the instrument seems to imply an underlying continuous distribution.

Pilot Study

A pilot study was conducted at Mountain Empire Regional Incubator (MERBI) in Duffield, Virginia and Jubilee Incubator in Sneedville, Tennessee. The MERBI's \$1.2 million facility was completed through the cooperation of the LENOWISCO Planning District, the Virginia Coalfield Economic Development Authority, Clinch Valley College, the Duffield Development Authority, and Mountain Empire Community College (MECC). MERBI has been managed by the MECC's Small Business Development Center since inception in 1998. The Jubilee Business Incubator has been in existence since March 1997. Its mostly art and craft businesses have exceeded their initial sales projections by 75%. The

Business Innovation Center in Mobile, Alabama, originally agreed to participate in the pilot study, but after receiving the pilot questionnaires did not respond. The two responding pilot study incubators provided valuable insights that resulted in the survey being trimmed from 20 to 17 accomplishment activities to be analyzed, clearer explanations of the demographic designations and accomplishment activities, and more explicit questionnaire instructions. The pilot study participants' average response time was approximately 14 minutes and most the respondents of the final improved questionnaire when asked answered that it took less than 10 minutes to complete the final questionnaire.

The following method of first e-mail or telephone contact of participants, delivering the survey, and reminding the non-responders was used in the pilot study. The pilot study was useful in refining the survey instrument and retrieval techniques.

Method

Prior to delivering of the coded questionnaire to the selected population, correspondence was conducted with the incubator directors and community colleges administrators to assure the best possible cooperation and survey response. The codes were used to identify the site and determine whether the

questionnaire was completed by an administrator or tenant. Packets containing the questionnaires, a cover letter (Appendix B) and self-addressed, stamped return envelopes were sent to or personally delivered to the incubator sites. Personal visits to the sites provided a positive contact that proved extremely valuable in obtaining an overall acceptable response rate. Concerning non-respondents, an extensive continuous effort over several months was maintained. The responsible incubator liaison was contacted (sometimes repeatedly) by telephone, fax, and e-mail (Appendix C). Completed questionnaires were received over several months by priority mail, fax, and as attachments to e-mails. Completed questionnaires were compiled by site using the site codes and the responses entered into a Statistical Package for the Social Sciences (SPSS) data file for data analysis.

Hypotheses

Based on the statement of the problem, research questions, and review of the literature, the following hypotheses were formulated. The hypotheses addressed the relationship between perceived community college accomplishments and their respective importance by administrators associated with Tennessee business incubators and the tenants in those incubators. The hypotheses also addressed the relationship

between personal factors and three overall community colleges' roles of employment skill development, economic development and incubator management. The hypotheses further examined the differences in personal factors compared to the three overall roles, and the differences in institutional factors compared to the three overall roles.

Hypotheses for this study were:

Hypothesis 1: There is no difference between administrators and tenants regarding their perceptions of how well the community college is accomplishing each of the 17 activities related to business incubation.

Hypothesis 2: There is no difference between administrators and tenants in their perceptions of how well the community college is accomplishing the 17 activities and the respective importance of the activities.

Hypothesis 3: There is no difference between the overall accomplishment role of employment skills development and the overall importance of employment skills development.

Hypothesis 4: There is no difference between the overall accomplishment role of economic development and the overall importance of economic development.

Hypothesis 5: There is no difference between the overall accomplishment role of incubator management and the overall importance of incubator management.

Hypothesis 6: There is no relationship between years in the position and the overall accomplishment role of employment skills development.

Hypothesis 7: There is no relationship between years in the incubator and the overall accomplishment role of employment skills development.

Hypothesis 8: There is no relationship between age and the overall accomplishment role of employment skills development.

Hypothesis 9: There is no relationship between years in the position and the overall accomplishment role of economic development.

Hypothesis 10: There is no relationship between years in the incubator and the overall accomplishment role of economic development.

Hypothesis 11: There is no relationship between age and the overall accomplishment role of economic development.

Hypothesis 12: There is no relationship between years in the position and the overall accomplishment role of incubator management.

Hypothesis 13: There is no relationship between years in the incubator and the overall accomplishment role of incubator management.

Hypothesis 14: There is no relationship between age and the overall accomplishment role of incubator management.

Hypothesis 15: There are no differences among respondents with different educational levels regarding the overall accomplishment role of employment skill development.

Hypothesis 16: There are no differences among respondents with different educational levels regarding the overall accomplishment role of economic development.

Hypothesis 17: There are no differences among respondents with different educational levels regarding the overall accomplishment role of incubator management.

Hypothesis 18: There is no difference between males and females regarding the overall accomplishment role of employment skill development.

Hypothesis 19: There is no difference between males and females regarding the overall accomplishment role of economic development.

Hypothesis 20: There is no difference between males and females regarding the overall accomplishment role of incubator management.

Hypothesis 21: There is no difference between rural and urban locations regarding the overall accomplishment of the role of employment skill development.

Hypothesis 22: There is no difference between rural and urban locations regarding the overall accomplishment of the role of economic development.

Hypothesis 23: There is no difference between rural and urban locations regarding the overall accomplishment of the role of incubator management.

Data Analysis

On the questionnaire, there were 17 supporting activities grouped into three community college roles (employment skill development, economic development, and incubator management). Statistical analysis was separately conducted on each of the activities and corresponding roles. Statistical methods used to analyze the activities and roles in this study included Cronbach's Alpha Reliability Coefficient, Pearson's Product-moment Correlation Coefficient, Analysis of Variance (ANOVA), t-test, Chi-square Test, and descriptive statistics.

The following procedures were used to analyze the data. The Cronbach Alpha Reliability Coefficient was used to measure if the reliability of the means of community college roles was acceptable. Cronbach's Alpha was applied to the three community college roles (employment skill development, economic development, and incubator management) grouping as to

accomplishment and importance. For example, the eight employment skill development activities (activities #6 through #13) were grouped together for the analysis. Therefore, for each role there would be two analyses, one for accomplishment and another for importance. There were a total of six analyses. With the exception of one analysis, each of the tested groups exceeded the Cronbach's Alpha Reliability Coefficient of .70 and was therefore acceptable. The incubator management importance group scored .6499. Because this one group was close to acceptable and consisted of just four data points, out of a total 34, the roles, overall, were judged acceptable for reliability.

The Pearson's Product-moment Correlation Coefficient was used to test the significance of the relationships between the dependent variable, three community college roles (employment skill development, economic development, and incubator management), and independent variables of years in present position, years associated with incubator, and age. ANOVA was used to test the categorical independent variables of education. The t-test was used to test the categorical independent variables that were dichotomous, including gender and location.

Chi-square analysis has been applied to each of the 17 questionnaire's accomplishing activities. Chi-square analysis was further conducted on the difference between the sum

responses regarding degree of accomplishment and importance for each of the 17 activities.

For all statistical tests, a .05 alpha level of significance was used. No violations of the assumption of homogeneity of variance were determined. Descriptive statistics (mean, standard deviation, minimum value, maximum value, and median) were used to summarize the survey population.

CHAPTER 4

DATA ANALYSIS

Survey Response

In this statewide survey, responses were obtained from five incubator sites. The data in this chapter were derived from 76 tenants and 21 administrators. These responses represented an overall 62% response rate from the potential participants. Table 1 shows the response rate for each site group, the site total response rate and the total survey response rate.

TABLE 1

RESPONSE RATE OF POTENTIAL SURVEY PARTICIPANTS

Site	Ten. <u>Pop.</u>	Ten. <u>N</u>	Ten. Response <u>Rate %</u>	Admin. <u>Pop.</u>	Admin. <u>N</u>	Admin. Response <u>Rate %</u>	Total Site Response <u>Rate %</u>
1 Urban	58	31	53	8	8	100	59
2 Rural	25	16	64	5	5	100	70
3 Urban	11	7	64	4	2	50	57
4 Rural	13	9	69	4	4	100	76
5 Rural	26	13	50	2	2	100	57
Total	133	76	57	23	21	91	62

Description of the Respondents

The questionnaire respondents were from five business incubators and related community colleges across Tennessee. The respondents were almost evenly split between rural and urban locations with 50.5% located in rural areas and 49.5% in urban areas. Regarding the location of the incubator business, 50.5% of the respondents were involved with incubator businesses located in rural areas, while 49.5% were in urban areas.

In this study, respondents were asked to report on the following personal characteristics: position, years in present position, years associated with incubator, level of formal education, age, and gender. With regard to position, 76 of the respondents were incubator tenants (78%) and 21 were administrators (22%). Considering years in present position, the respondents had a median of 2.0 with a 2.87 mean. The longest that a respondent reported being in his/her position was 15 years. (Table 2.) Considering that Tennessee incubators accept only start-up companies, this result of low median and mean of years in present position was not surprising.

Years associated with the incubator also had a 2.0 median with a 1.99 mean. The longest that a respondent reported being associated with the incubator was 9 years. (Table 2.) As with years in the position, because of the age of Tennessee

incubators and the qualification that their tenants be start-up companies this result was expected.

From the questionnaire the year of birth was used to calculate each respondent's age (Age = 2000 - year of birth). The respondents had a mean age of 43.6 and a median age of 45. The ages ranged from 18 to 70. (Table 2.)

TABLE 2
 DESCRIPTIVE STATISTICS FOR YEARS IN POSITION,
 YEARS WITH INCUBATOR, AND AGE

	N	Mean	Median	Std. Dev.	Min.	Max.
Years in position	96	2.8	2	3.06	0	15
Years with incubator	96	1.99	2	1.76	0	9
Age	95	43.6	45	9.27	18	70

The overwhelming majority of respondents (90%) had attended college. Twenty-three percent had earned four-year degrees and 26% had graduate/professional degrees. Although generally entrepreneurs and administrators are achievers, the number of respondents who had at least attended college supported a contention that colleges are considered a resource for entrepreneurs. The gender breakdown of the respondents was almost evenly spilt between female (48%) and male (52%).

Data Analysis

The purpose of this study was to ascertain the role of local community colleges in existing Tennessee business incubation development, and to compare administrators' and tenants' perceptions of the accomplishment and importance of activities. As previously stated, the administrators could be either parts of the incubator organizations or the local community colleges. All the administrators surveyed had some community college connection.

In support of this purpose, the research questions and hypotheses to be addressed in this study were:

1. How well are local community colleges accomplishing activities related to business incubators?
2. Are there differences between administrators associated with business incubators and incubator tenants regarding their perceptions of how well the local community college is accomplishing the activities related to business incubation?

Hypothesis 1: There is no difference between

administrators and tenants regarding their perceptions of how well the community college is accomplishing each of the 17 activities related to business incubation.

3. Are there differences between administrators and tenants in their perceptions of how well community colleges are

accomplishing each of the 17 activities and the activities' importance?

Hypothesis 2: There is no difference between administrators and tenants in their perceptions of how well the community college is accomplishing the 17 activities and the respective importance of the activities.

4. Are there differences between the overall accomplishment roles for employment skill development, economic development, and incubator management and the overall importance of these roles?

Hypothesis 3: There is no difference between the overall accomplishment role of employment skills development and the overall importance of employment skills development.

Hypothesis 4: There is no difference between the overall accomplishment role of economic development and the overall importance of economic development.

Hypothesis 5: There is no difference between the overall accomplishment role of incubator management and the overall importance of incubator management.

5. What are the relationships between the personal factors of a) years in the position, b) years associated with the incubator, and c) age with each of three overall accomplishment roles of employment skill development, economic development, and incubator management?

Hypothesis 6: There is no relationship between years in the position and the overall accomplishment role of employment skills development.

Hypothesis 7: There is no relationship between years in the incubator and the overall accomplishment role of employment skills development.

Hypothesis 8: There is no relationship between age and the overall accomplishment role of employment skill development.

Hypothesis 9: There is no relationship between years in the position and the overall accomplishment role of economic development.

Hypothesis 10: There is no relationship between years in the incubator and the overall accomplishment role of economic development.

Hypothesis 11: There is no relationship between age and the overall accomplishment role of economic development.

Hypothesis 12: There is no relationship between years in the position and the overall accomplishment role of incubator management.

Hypothesis 13: There is no relationship between years in the incubator and the overall accomplishment role of incubator management.

Hypothesis 14: There is no relationship between age and the overall accomplishment role of incubator management.

6. Are there differences in the personal factors of

a) educational level and b) gender and the overall accomplishment roles of employment skill development, economic development, and incubator management?

Hypothesis 15: There are no differences among respondents with different educational levels regarding the overall accomplishment role of employment skill development.

Hypothesis 16: There are no differences among respondents with different educational levels regarding the overall accomplishment role of economic development.

Hypothesis 17: There are no differences among respondents with different educational levels regarding the overall accomplishment role of incubator management.

Hypothesis 18: There is no difference between males and females regarding the overall accomplishment role of employment skill development.

Hypothesis 19: There is no difference between males and females regarding the overall accomplishment role of economic development.

Hypothesis 20: There is no difference between males and females regarding the overall accomplishment role of incubator management.

7. Are there differences in the institutional factors of
a) location and b) mission statement and the overall
accomplishment roles of employment skill development,
economic development, and incubator management?

Hypothesis 21: There is no difference between rural and
urban locations regarding the overall accomplishment of the
role of employment skill development.

Hypothesis 22: There is no difference between rural and
urban locations regarding the overall accomplishment of the
role of economic development.

Hypothesis 23: There is no difference between rural and
urban locations regarding the overall accomplishment of the
role of incubator management.

The organization of the data analysis of the chapter
follows the order of the research questions posed in Chapter 1.
This chapter also presents the results of testing the hypotheses
derived from the research questions. A summary of the
participants' suggestions for improving the relationship between
the local community college and the incubator is presented as
the final section of the chapter.

Analysis of Data for Research Question #1

The first research question investigated in this study was: How well are local community colleges accomplishing activities related business incubators?

For this analysis all 97 respondents were included. To facilitate readability and interpretation, each of the accomplishment activities was coded into four categories: 1) no opinion; 2) low and very low combined; 3) moderate; and 4) high and very high combined. The "low or very low" response was indicative that the accomplishment of the activity was perceived as not being fulfilled. The "moderate" category indicated a moderate degree of accomplishment, while the "high or very high" response category indicated that the activity was perceived as being accomplished. To answer this research question, univariate descriptive statistics were used. The results are summarized in Table 3.

Over 50% of the survey participants recorded a "no opinion", "low", or "very low" for a majority of the activities, 9 of the 17 activities. The activity receiving the highest percentage of the "low" or "very low" response for community college accomplishing was activity 15: "Using an incubator advisory committee to maintain the linkage between incubator small business owners and the community college." A third of the respondents, 33%, marked "low" or "very low" and 26% marked "no

opinion" showing that the accomplishing of this activity was perceived as not being fulfilled by a third of the respondents and that approximately 27% did not have sufficient interest or knowledge to register an opinion. The activity that received the lowest percentage of "low" and "very low" responses was activity #6: "Providing consultative services to assist in solving problems for the incubator small business owners." Of all 97 participants, 12% marked "low or very low" and 19% marked "no opinion"; compared with 18% of the participants who marked "moderate". Over half (52%) of the participants marked "high or very high" indicating that the activity accomplishment was perceived as being fulfilled by a majority of the participants.

Two activities tied for receiving the highest percentage of a combined moderate degree of perceived accomplishment and being accomplished. The activities were activity #10: "operating a small business center at the incubator site for the use of the incubator tenants" and activity #9: "operating a resource library at the incubator site for the use of the incubator tenants." Activity #10 received 54% "high" or "very high" marks and activity #9 recorded just a percent less (53%) "high" or "very high" mark. Combining the "moderate" marks for a convincing 66% total, both activities were most perceived as being moderately accomplished and

accomplished. Table 3 presents a summary of the participants' perceptions of each activity.

TABLE 3
DEGREES OF ACCOMPLISHMENT
OF COMMUNITY COLLEGE ACTIVITIES

Activity	No Opinion		Low/Very Low Accomplish.		Moderate Accomplish.		High/Very High Accomplish.	
	%	n	%	n	%	n	%	n
1) Needs Training	23%	(22)	28%	(27)	16%	(15)	34%	(33)
2) Basic Skills Training	26%	(25)	28%	(27)	21%	(20)	26%	(25)
3) On-the-Job Training	29%	(28)	27%	(26)	17%	(16)	28%	(27)
4) Faculty Release Time	38%	(37)	26%	(25)	24%	(23)	12%	(12)
5) Provide Workshops	24%	(23)	26%	(25)	21%	(20)	30%	(29)
6) Provide Consulting	19%	(18)	12%	(12)	18%	(17)	52%	(50)
7) Provide Student Interns	28%	(27)	29%	(28)	19%	(18)	25%	(24)
8) Provide Labor Information	27%	(26)	22%	(21)	24%	(23)	28%	(27)
9) Operate Resource Library	18%	(17)	17%	(16)	13%	(13)	53%	(51)
10) Operate Business Center	17%	(16)	18%	(17)	12%	(12)	54%	(52)
11) Assess Economy Status	27%	(26)	24%	(23)	28%	(27)	22%	(21)
12) Publicize Research Results	25%	(24)	32%	(31)	23%	(22)	21%	(20)
13) Organize Master Plan	25%	(24)	24%	(23)	20%	(19)	32%	(31)
14) Form Partnerships	24%	(23)	26%	(25)	25%	(24)	26%	(31)
15) Use Advisory Committee	27%	(26)	33%	(32)	17%	(16)	24%	(23)
16) Serve Incubator Board	37%	(36)	31%	(30)	20%	(19)	12%	(12)
17) Provide Staff Services	26%	(25)	21%	(20)	22%	(21)	32%	(31)

In addition to the percentage analysis, means were tabulated on Likert-scale responses to accomplishment activities. For the mean calculations, the "no opinion" responses were excluded from the analysis. Means were calculated for the total responses, the tenants' responses and the administrators' responses. The results are summarized in Table 4.

For the purpose of this dissertation and corresponding to the questionnaire's designations, a mean score of below 1 for the activity indicated that this activity being accomplished was perceived overall as "very low"; followed by 1 to 2 being perceived overall as "low"; followed by above 2 to 3 being perceived overall as "moderate"; followed by above 3 to 4 being perceived overall as "high"; and above 4 to 5 being perceived overall as "very high". For this research question, the total responses mean score for each activity was examined. The highest mean score was 3.69 for activity #10: "operating a small business center at the incubator site for the use of the incubator tenants". As mentioned earlier in the percentage analysis, this activity also received the highest percentage of "high" and "very high" responses. In addition to this activity, five other activities that had a mean score indicating an overall accomplishment perception of "high" (Table 4). The lowest mean score for total responses was 2.52 in the "moderate"

range for activity #4: "providing community college instructors with release time from their teaching duties to work in the incubator companies to update their knowledge and skills" (Table 4). "Comparing to the percentage calculation, this activity had the highest percentage of "no opinion" (38%), a 26% "low" or "very low" total, a 24% "moderate" total, and shared with one other activity of getting a 12% "high" or "very high" total, the lowest in that category of any activity.

Analysis of Data for Research Question #2

The second research question investigated in this study is: Are there differences between administrators associated with business incubators and incubator tenants regarding their perception of how well the local community college is accomplishing the activities related to business incubation?

Hypothesis 1: There is no difference between administrators and tenants regarding their perceptions of how well the community college is accomplishing each of the 17 activities related to business incubation.

The accomplishment activities were coded into the following three categories: 1 = low or very low; 2 = moderate; 3 = high or very high. "No opinion" was omitted from the analysis. The "low" or "very low" response indicated that the activity was not being accomplished. The "moderate" category

TABLE 4
 MEANS AND STANDARD DEVIATIONS
 FOR ACCOMPLISHMENT ACTIVITIES

Activity	<u>Total</u>			<u>Tenants</u>			<u>Administrators</u>		
	<u>N</u>	<u>M</u>	<u>Sd</u>	<u>N</u>	<u>M</u>	<u>Sd</u>	<u>N</u>	<u>M</u>	<u>Sd</u>
1) Needs Training	75	3.05	1.39	57	3.05	1.29	18	3.06	1.73
2) Basic Skills Training	72	2.82	1.26	53	2.96	1.18	19	2.42	1.43
3) On-the-Job Training	69	2.88	1.37	51	3.14	1.23	18	2.17	1.51
4) Faculty Release Time	60	2.52	1.27	45	2.76	1.11	15	1.80	1.47
5) Provide Workshops	74	2.92	1.25	56	2.98	1.15	18	2.72	1.53
6) Provide Consulting	79	3.62	1.26	60	3.63	1.19	19	3.58	1.50
7) Provide Student Interns	70	2.85	1.54	52	2.89	1.50	18	2.78	1.70
8) Provide Labor Information	71	2.97	1.31	53	3.17	1.22	18	2.39	1.42
9) Operate Resource Library	80	3.56	1.46	61	3.51	1.43	19	3.74	1.56
10) Operate Business Center	81	3.69	1.44	61	3.59	1.38	20	4.00	1.59
11) Assess Economy Status	71	2.83	1.21	51	3.00	1.20	20	2.40	1.14
12) Publicize Research Results	73	2.67	1.25	54	2.76	1.23	19	2.42	1.30
13) Organize Master Plan	73	3.11	1.41	54	3.30	1.31	19	2.58	1.58
14) Form Partnerships	74	2.96	1.46	57	2.97	1.41	17	2.94	1.64
15) Use Advisory Committee	71	2.75	1.40	52	2.77	1.37	19	2.68	1.53
16) Serve Incubator Board	61	2.49	1.18	42	2.38	.94	19	2.74	1.59
17) Provide Staff Services	72	3.17	1.41	54	3.20	1.39	18	3.06	1.51

indicated a moderate degree of accomplishment, and the "high" and "very high" category was indicative of a high degree of accomplishment.

The Chi-square test of significance was used to test the difference between tenants and administrators for each of the 17 activities. Assumptions of the Chi-square statistic are: (1) the percentage of cells with an expected frequency of less than five must not exceed 20% and (2) the minimum expected frequency in each cell must be at least one.

Each activity was inspected for violations of the assumptions. There were three accomplishment activities (#6: provide consulting services, #9: operate a resource library, #10: operate a business center) in which there were violations. In an attempt to correct for the violations these three activities were recoded into two categories:

1 = low or very low

2 = moderate, high or very high

These 2 X 2 tables also showed violations of the assumptions of Chi-square. Therefore, for these three activities, the Chi-square test of significance could not be used and were labeled as "NA" (Not Applicable) in the probability column of Table 5.

Of the 14 remaining activities for which the Chi-square was applicable, the null hypothesis was retained for the 10 activities (Table 5). The null hypothesis was rejected for

activities related to #4: provide release time, #5: provide workshops, #8: provide labor information and #16: serve on incubator board.

For these above activities that were statistically significant, differences were found between tenants and administrators. For activity #4: "providing community college instructors with release time from their teaching duties to work in the incubator companies to update their knowledge and skills", 73% of the administrators perceived this activity as not being accomplished as opposed to 31% of the tenants. With regard to activity #5: "providing courses/workshops upon demand for the incubator small business tenant owners and their employees", the largest difference between administrators and tenants was in the "moderate" category, where 34% of the tenants, but only 6% of the administrators rated this activity as "moderate". There was also a considerable difference between tenants (29%) and administrators (50%) in their perceptions that the courses and workshops activity was not being accomplished ("low" or "very low" responses).

The third activity where the difference between administrators and tenants was statistically significant was activity #8: "providing labor market information related to occupational trends to the incubator small business owners". The largest difference between administrators and tenants was in

the "low" or "very low" category where 56% of the administrators, but only 21% of the tenants rated this activity as "low" or "very low". The remaining activity where the difference between administrators and tenants was statistically significant was activity #16: "offering college personnel to serve on the incubator board of directors" where the difference between tenants and administrators was in the "high" or "very high" category. Only 10% of the tenants compared to 42% of the administrators indicated that this activity was being accomplished.

In addition to the Chi-square analysis, means were tabulated on Likert-type scale responses to accomplishment activities. For the means calculation, the "no opinion" responses were excluded from the analysis. Regarding accomplishment, there were different results of the means for administrators' responses and the tenants' responses. The results are summarized in Table 4. The tenants' and administrators' means reflected the Chi-square analysis. The four activities where the difference between the perceptions administrators and tenants were statistically significant had mixed mean differences. Two activities, #4: provide release time and #8: provide labor information posted some of the highest differences, .96 and .75 respectively. The other two statistically significant activities posted low mean

differences. The activity that posted the highest mean difference (.97) between administrators and tenants was activity #3: assisting in on-the-job technical and apprenticeship-training in cooperation with the incubator small business tenant owners". (Table 4)

Analysis of Data for Research Question #3

The third research question investigated in this study was: Are there differences between administrators and tenants in their perceptions of how well community colleges are accomplishing each of the 17 activities and the activities' importance?

Hypothesis 2: There is no difference between administrators and tenants in their perceptions of how well the community college is accomplishing the 17 activities and the respective importance of the activities.

To answer this research question and to test the corresponding hypotheses, new variables were created. For this analysis, each of the accomplishment activities and the activities' importance were coded on the 5-point Likert scale. "No opinion" was excluded from the analysis. For each of the 17 activities a new variable was created by subtracting the importance of an activity from the accomplishment level of the activity. As a result, a value of zero on these new variables

TABLE 5

TENANTS' AND ADMINISTRATORS' PERCEIVED
ACCOMPLISHMENTS OF COMMUNITY COLLEGE ACTIVITIES

Activity	Status	Low/Very Low Accomplish.		Moderate Accomplish.		High/Very High Accomplish.		Chi Sq.	p
		%	N	%	N	%	N		
1) Needs Training	Ten.	35%	(20)	21%	(12)	44%	(25)	.188	.910
	Admin.	39%	(7)	17%	(3)	44%	(8)		
2) Basic Skills Training	Ten.	32%	(17)	32%	(17)	36%	(19)	2.985	.225
	Admin.	56%	(10)	16%	(3)	32%	(6)		
3) On-the-Job Training	Ten.	29%	(15)	26%	(13)	45%	(23)	5.774	.056
	Admin.	61%	(11)	17%	(3)	22%	(4)		
4) Faculty Release Time	Ten.	31%	(14)	47%	(21)	22%	(10)	8.519	.014*
	Admin.	73%	(11)	13%	(2)	13%	(2)		
5) Provide Workshops	Ten.	29%	(16)	34%	(19)	38%	(21)	6.076	.048*
	Admin.	50%	(9)	6%	(1)	44%	(8)		
6) Provide Consulting	Ten.	13%	(8)	25%	(15)	62%	(37)	2.075	NA
	Admin.	21%	(4)	11%	(2)	68%	(13)		
7) Provide Student Interns	Ten.	35%	(18)	33%	(17)	33%	(17)	5.445	.066
	Admin.	56%	(10)	6%	(1)	39%	(7)		
8) Provide Labor Information	Ten.	21%	(11)	36%	(19)	43%	(23)	7.856	.020*
	Admin.	56%	(10)	22%	(4)	22%	(4)		
9) Operate Resource Library	Ten.	20%	(12)	20%	(12)	61%	(37)	2.251	NA
	Admin.	21%	(4)	5%	(1)	74%	(14)		
10) Operate Business Center	Ten.	21%	(13)	20%	(12)	59%	(36)	4.980	NA
	Admin.	20%	(4)	0%	(0)	80%	(16)		
11) Assess Economy Status	Ten.	29%	(15)	35%	(18)	35%	(18)	2.853	.240
	Admin.	40%	(8)	45%	(9)	15%	(3)		
12) Publicize Research Results	Ten.	41%	(22)	30%	(16)	30%	(16)	.540	.763
	Admin.	47%	(9)	32%	(6)	21%	(4)		
13) Organize Master Plan	Ten.	24%	(13)	28%	(15)	48%	(26)	5.460	.065
	Admin.	53%	(10)	21%	(4)	26%	(5)		
14) Form Partnerships	Ten.	33%	(19)	35%	(20)	32%	(18)	.911	.634
	Admin.	35%	(6)	24%	(4)	41%	(7)		
15) Use Advisory Committee	Ten.	44%	(23)	27%	(14)	29%	(15)	2.446	.294
	Admin.	47%	(9)	11%	(2)	42%	(8)		
16) Serve Incubator Board	Ten.	50%	(21)	41%	(17)	10%	(4)	10.845	.004*
	Admin.	47%	(9)	11%	(2)	42%	(8)		
17) Provide Staff Services	Ten.	26%	(14)	33%	(18)	41%	(22)	1.821	.402
	Admin.	33%	(6)	17%	(3)	50%	(9)		

* significant at the .05 level

NA Not Applicable

indicated there was no difference between the respondent's perception of the importance and the accomplishment of the activity. A positive value meant that the accomplishment level of the activity exceeded its importance. A negative value meant that the importance of the activity exceeded the accomplishment level. In other words, negative values on these variables indicated that the respondents viewed the importance of the activity higher than the actual accomplishment level.

These new variables representing the difference between how well the activity was being accomplished and its importance were then collapsed into two categories where 1 = negative responses and 2 = no difference or positive responses.

For this analysis, the independent variable was respondents' status (tenant or administrator) and each dependent variable was the difference between a given accomplishment activity and its importance. The 17 hypotheses for each 2 X 2 table were tested using the Chi-square test of significance. None of the 17 crosstabulated tables showed violations of the assumptions of Chi-square and none of the 17 null hypotheses was rejected. Table 6 is a summary table of the analysis. Because each of the 17 dependent variables had only two categories, only the negative category (importance exceeded its accomplishment) is shown.

Although there was no statistically significant difference between administrators and tenants, some results of the activities have high percentages of importance exceeding accomplishment that indicated that the respondents felt the activity needed more attention. The highest total percentage where importance exceeded accomplishment (64%) was activity #3: "assisting in on-the-job technical and apprenticeship-training in cooperation with the incubator small business tenant owners. By its highest percentage (65%) tenants perceived that activity #1: "conducting training and retraining programs on-site relevant to the specific needs of the incubator small business owners and their employees" needed more attention. Almost three-fourths (73%) of the administrators that responded perceived that activity #4: "providing community college instructors with release time from their teaching duties to work in the incubator companies to update their knowledge and skills" needed more attention. (Table 6).

In addition to Chi-square analysis, there were two means tables (Table 7 and Table 8) used to further analyze the difference between the perceptions of accomplishment and importance for the 17 activities. Table 7 shows the mean difference between accomplishment activities and importance. This table has all negative differences, indicating that none of the accomplishments was perceived by tenants or administrators

TABLE 6

DIFFERENCE BETWEEN THE ACCOMPLISHMENT
OF ACTIVITIES AND THE IMPORTANCE OF ACTIVITIES
AS PERCEIVED BY TENANTS AND ADMINISTRATORS

Activity	Importance Exceeds Accomplishment <u>Total</u>		Importance Exceeds Accomplishment <u>Tenant</u>		Importance Exceeds Accomplishment <u>Administrator</u>		Chi Sq.	p
	%	N	%	N	%	N		
1) Needs Training	63%	(47)	65%	(37)	56%	(10)	.512	.474
2) Basic Skills Training	53%	(38)	55%	(29)	47%	(9)	.303	.582
3) On-the-Job Training	64%	(44)	61%	(31)	72%	(13)	.753	.385
4) Faculty Release Time	60%	(36)	56%	(25)	73%	(11)	1.481	.224
5) Provide Workshops	62%	(46)	63%	(35)	61%	(11)	.011	.916
6) Provide Consulting	47%	(37)	47%	(28)	47%	(9)	.003	.957
7) Provide Student Interns	49%	(34)	44%	(23)	61%	(11)	1.515	.217
8) Provide Labor Information	42%	(30)	45%	(24)	33%	(6)	.786	.375
9) Operate Resource Library	31%	(25)	33%	(20)	26%	(5)	.282	.595
10) Operate Business Center	31%	(25)	35%	(21)	20%	(4)	1.571	.210
11) Assess Economy Status	48%	(34)	51%	(26)	40%	(8)	.694	.405
12) Publicize Research Results	46%	(33)	49%	(26)	38%	(7)	.840	.359
13) Organize Master Plan	41%	(30)	35%	(19)	58%	(11)	2.994	.084
14) Form Partnerships	45%	(33)	42%	(24)	53%	(9)	.622	.430
15) Use Advisory Committee	49%	(35)	48%	(25)	53%	(10)	.115	.734
16) Serve Incubator Board	39%	(24)	43%	(18)	32%	(6)	.697	.404
17) Provide Staff Services	51%	(37)	56%	(30)	39%	(7)	1.501	.220

* significant at the .05 level

as being achieved more than its importance. As with the Chi-square analysis, this result indicates that both the tenants and the administrators perceived that more attention should be devoted by the community colleges to the incubator support activities.

Table 8 shows the importance means. The means in this table are all more than 3. In earlier analysis, the means in the 3 to 4 range were considered "high" and more than 4 "very high". Table 8 indicates that the community college support activities had value to both the tenants and the administrators. Both the tenants (4.37) and the administrators (4.57) had the highest mean score was for activity #6: "providing consultative services to assist in solving problems for incubator small business owners".

Analysis of Data for Research Question # 4

The fourth research question addressed in this study was: What is the relationship between the overall accomplishment roles for skills development, economic development, and incubator management and the overall importance of these roles?

Hypothesis 3: There is no difference between the overall accomplishment role of skills development and the overall importance of skills.

TABLE 7

MEANS AND STANDARD DEVIATIONS FOR
 VARIABLES THAT REPRESENT THE DIFFERENCE
 BETWEEN ACCOMPLISHMENT AND IMPORTANCE OF ACTIVITIES

Activity	Total			Tenants			Administrators		
	N	M	Sd.	N	M	Sd.	N	M	Sd.
1) Needs Training	75	-1.16	1.39	57	-1.09	1.37	18	-1.39	1.46
2) Basic Skills Training	72	-.94	1.41	53	-.87	1.23	19	-1.16	1.86
3) On-the-Job Training	69	-1.16	1.32	51	-1.00	1.22	18	-1.61	1.54
4) Faculty Release Time	60	-1.25	1.85	45	-1.16	1.52	15	-1.53	2.64
5) Provide Workshops	74	-1.22	1.32	56	-1.09	1.18	18	-1.61	1.65
6) Provide Consulting	79	-.81	1.28	60	-.73	1.21	19	-1.05	1.51
7) Provide Student Interns	70	-1.15	1.57	52	-1.12	1.60	18	-1.22	1.52
8) Provide Labor Information	71	-.76	1.54	53	-.77	1.46	18	-.72	1.81
9) Operate Resource Library	80	-.75	1.37	61	-.77	1.41	19	-.68	1.29
10) Operate Business Center	80	-.68	1.32	60	-.77	1.38	20	-.40	1.10
11) Assess Economy Status	71	-.87	1.26	51	-.86	1.22	20	-.90	1.41
12) Publicize Research Results	72	-1.01	1.52	53	-1.09	1.54	19	-.79	1.51
13) Organize Master Plan	73	-.73	1.19	54	-.57	1.11	19	-1.16	1.34
14) Form Partnerships	74	-.99	1.33	57	-.93	1.31	17	-1.18	1.42
15) Use Advisory Committee	71	-1.10	1.48	52	-1.12	1.42	19	-1.05	1.65
16) Serve Incubator Board	61	-.79	1.44	42	-.93	1.41	19	-.47	1.50
17) Provide Staff Services	72	-1.11	1.38	54	-1.19	1.40	18	-.89	1.32

TABLE 8

MEANS AND STANDARD DEVIATIONS

FOR IMPORTANCE OF ACTIVITIES

Activity	Total			Tenants			Administrators		
	N	M	Sd	N	M	Sd	N	M	Sd
1) Needs Training	90	4.14	1.10	69	4.07	1.18	21	4.38	.74
2) Basic Skills Training	87	3.61	1.24	66	3.62	1.17	21	3.57	1.47
3) On-the-Job Training	85	3.94	1.08	64	3.98	1.02	21	3.86	1.28
4) Faculty Release Time	77	3.73	1.20	58	3.90	1.0387	19	3.21	1.51
5) Provide Workshops	88	4.14	.85	67	4.05	.90	21	4.33	.66
6) Provide Consulting	87	4.41	.71	66	4.36	.72	21	4.57	.68
7) Provide Student Interns	85	3.94	1.05	64	3.92	1.07	21	4.00	1.00
8) Provide Labor Information	86	3.74	1.20	65	3.94	1.09	21	3.14	1.35
9) Operate Resource Library	90	4.27	.85	69	4.25	.90	21	4.33	.66
10) Operate Business Center	86	4.30	1.05	66	4.27	1.10	20	4.40	.88
11) Assess Economy Status	84	3.75	1.07	63	3.90	1.04	21	3.29	1.06
12) Publicize Research Results	87	3.72	1.086	66	3.89	1.04	21	3.19	1.08
13) Organize Master Plan	86	3.78	1.100	65	3.82	1.04	21	3.67	1.28
14) Form Partnerships	89	3.76	1.19	69	3.75	1.16	20	3.80	1.32
15) Use Advisory Committee	84	3.86	.98	64	3.89	.99	20	3.75	.97
16) Serve Incubator Board	78	3.37	1.30	57	3.37	1.29	21	3.38	1.36
17) Provide Staff Services	82	4.15	.89	62	4.24	.84	20	3.85	.99

Hypothesis 4: There is no difference between the overall accomplishment role of economic development and the overall importance of economic development.

Hypothesis 5: There is no difference between the overall accomplishment role of management and the overall importance of management.

To answer this research question, six new variables were created to reflect the overall accomplishment and overall importance of the three community college roles (employment skill development, economic development, and incubator management). The individual activities grouped for each role was coded on the 5-point Likert scale, with "no opinion" omitted from the analysis. The six new variables were created by summing the scores of the activities related to each specific accomplishment role and the overall importance of each role. For example, the new variable that measured the overall employment skill development accomplishment role was the sum of the five accomplishment activities related to employment skill development. The new variable for the overall importance of employment skill development role was the sum of the five importance scores for the five activities related to employment skill development.

Prior to summing the variable, each was examined for its internal consistency using the Cronbach's alpha reliability

coefficient. The Cronbach's alpha for the six new variables was as follows:

Accomplishment for Skills Development = .92.

Importance of Skills Development = .77.

Accomplishment for Economic Development = .92

Importance of Economic Development = .82

Accomplishment for Management = .86

Importance of Management = .65.

For the hypotheses related to the relationships between overall accomplishment roles and their importance, Pearson's Product-moment Correlation Coefficient was used. Table 9 summarizes the results of correlation testing.

As shown in Table 9, only the relationship between Incubator Management Accomplishment and Importance was statistically significant at the .05 level ($p = .03$). The null hypotheses were retained for the Employment Skill Development ($p = .803$) and Economic Development ($p = .299$).

Analysis of Data for Research Question #5

The fifth research question investigated in this study was: What are the relationships between the personal factors of a) years in the position, b) years associated with the incubator, and c) age with each of three overall accomplishment roles of skills development, economic development, and incubator management?

TABLE 9

DIFFERENCES BETWEEN MEAN SCORES OF ACCOMPLISHMENT AND IMPORTANCE OF THE THREE COMMUNITY COLLEGE INCUBATOR ROLES

Community College Roles	n	Pearson's r	Sig.
Employment Skill Development Accomplishment with Importance	54	.035	.803
Economic Development Accomplishment with Importance	60	.136	.299
Incubator Management Accomplishment with Importance	56	.290	.030*

* significant at the .05 level

Hypothesis 6: There is no relationship between years in the position and the overall accomplishment role of employment skills development.

Hypothesis 7: There is no relationship between years in the incubator and the overall accomplishment role of employment skills development.

Hypothesis 8: There is no relationship between age and the overall accomplishment role of employment skills development.

Hypothesis 9: There is no relationship between years in the position and the overall accomplishment role of economic development.

Hypothesis 10: There is no relationship between years in the incubator and the overall accomplishment role of economic development.

Hypothesis 11: There is no relationship between age and the overall accomplishment role of economic development.

Hypothesis 12: There is no relationship between years in the position and the overall accomplishment role of incubator management.

Hypothesis 13: There is no relationship between years in the incubator and the overall accomplishment role of incubator management.

Hypothesis 14: There is no relationship between age and the overall accomplishment role of incubator management.

Pearson's Correlation was used to analyze the data for this research question. Table 10 provides a synopsis of data generated from the Pearson's Correlation.

No significant relationship was found between years in the position and the perceived accomplishments for three roles:

Employment Skill Development ($p = .841$); Economic Development ($p = .914$); and Incubator Management ($p = .796$). The null hypotheses were retained.

No significant relationship was found between years associated with the incubator and the perceived accomplishments of community colleges for the three roles: Employment Skill Development ($p = .841$); Economic Development ($p = .186$); and Incubator Management ($p = .910$). The null hypotheses were retained.

No significant relationship was found between age and the perceived accomplishments of community colleges toward incubators for the three roles: Employment Skill Development ($p = .200$); Economic Development ($p = .064$); and Incubator Management ($p = .226$). The null hypotheses were retained.

Analysis of Research Question #6

The sixth research question in this study was: Are there differences in the personal factors of a) educational level and b) gender and the overall accomplishment roles of skills development, economic development, and incubator management?

Hypothesis 15: There are no differences among respondents with different educational levels regarding the overall accomplishment role of employment skill development.

TABLE 10

CORRELATION OF MEANS BETWEEN YEARS IN POSITION, YEARS WITH INCUBATOR, AND AGE WITH THREE COMMUNITY COLLEGE ROLES

		Employment Skill Dev.	Economic Dev.	Management Dev.
Yrs in Pos.	Pearson Corr.	.028	.014	-.035
	Sig. (2-tail)	.841	.914	.796
	N	53	60	56
Yrs. incub.	Pearson Corr.	.028	.173	-.015
	Sig. (2-tail)	.841	.186	.910
	N	53	60	56
Age	Pearson Corr.	-.181	-.243	-.166
	Sig. (2-tail)	.200	.064	.226
	N	52	59	55

Hypothesis 16: There are no differences among respondents with different educational levels regarding the overall accomplishment role of economic development.

Hypothesis 17: There are no differences among respondents with different educational levels regarding the overall accomplishment role of incubator management.

Hypothesis 18: There is no difference between males and females regarding the overall accomplishment role of employment skill development.

Hypothesis 19: There is no difference between males and females regarding the overall accomplishment role of economic development.

Hypothesis 20: There is no difference between males and females regarding the overall accomplishment role of incubator management.

One-way analysis of variance (ANOVA) was used to test the hypothesis that there is no difference among the educational levels and the three accomplishment roles. Levene's test for equality of variance showed there were no violations of the assumption of homogeneity of variance.

The ANOVA showed there were no significant differences found among the educational levels on each of the three accomplishment roles: Employment Skill Development ($p = .875$); Economic Development ($p = .840$); and Incubator Management ($p = .774$). The null hypotheses were retained.

To test the hypotheses related to Gender, a two-tailed t-test for independent samples was used. Levene's test for equality of variances showed there were no violations of this assumption.

The results of the t-tests showed there were no significant differences between males and females on the three roles:

TABLE 11

ANALYSIS OF VARIANCE BETWEEN EDUCATION
AND THREE COMMUNITY COLLEGE ROLES

Roles		Sum of Squares	df	Mean Square	F	Sig.
Employment Skill Development	Education	44.035	4	11.009	.303	.875
	Error	1745.135	48	36.357		
	Total	1789.170	52			
Economic Development	Education	121.537	4	30.384	.354	.840
	Error	4718.196	55	85.785		
	Total	4839.733	59			
Incubator Management	Education	39.738	4	9.934	.448	.774
	Error	1131.976	51	22.196		
	Total	1171.714	55			

Employment Skill Development ($p = .729$); Economic Development ($p = .337$); and Incubator Management ($p = .915$). The null hypotheses were retained.

Analysis of Data for Research Question #7

Are there differences in the institutional factors of a) location and b) mission statement and the overall accomplishment roles of skill, economic development, and incubator management?

Hypothesis 21: There is no difference between rural and urban locations regarding the overall accomplishment of the role of employment skill development.

TABLE 12

T-TEST FOR GENDER MEANS AND THREE COMMUNITY COLLEGE ROLES

Community College Roles	Gender	N	Mean	Sd	t	df	Sig.(2- tailed)
Employment Skill Dev.	Females	32	13.47	6.05	.348	51	.729
	Males	21	14.05	5.71			
Economic Development	Females	33	23.24	9.61	.968	58	.337
	Males	27	25.52	8.35			
Incubator Management	Females	30	10.87	4.90	.107	54	.915
	Males	26	11.00	4.35			

Hypothesis 22: There is no difference between rural and urban locations regarding the overall accomplishment of the role of economic development.

Hypothesis 23: There is no difference between rural and urban locations regarding the overall accomplishment of the role of incubator management.

The t-test for independent samples was used to test the hypotheses for location and each of the accomplishment roles of employment skills development, economic development, and incubator management. Levene's test of equality of variances showed there were no violations of the assumption of homogeneity of variances.

As shown in Table 13, there were no significant differences between rural and urban areas for the three accomplishment roles: employment skill development ($p = .997$), economic development ($p = .147$), and incubator management ($p = .845$). The null hypotheses were retained.

TABLE 13

T-TESTS FOR LOCATION AND THREE COMMUNITY COLLEGE ROLES

Location	Site	N	Mean	Sd	t	df	Sig.(2-tailed)
Employment Skill Dev.	Rural	32	13.69	6.48	.003	52	.997
	Urban	22	13.68	4.81			
Economic Development	Rural	35	22.83	9.63	1.47	58	.147
	Urban	25	26.28	7.94			
Incubator Management	Rural	33	11.03	4.83	.196	54	.845
	Urban	23	10.78	4.39			

For purpose of this dissertation, in order to fulfill confidentiality assurances to the incubator directors, the size of the rural or urban community college was not analyzed. The size of the five related community colleges ranged from an enrollment slightly over 3,000 to almost 8,000 students based on Fall 2000 enrollments (Tennessee Board of Regents, September 26, 2000). Based on the five community colleges 2000-2001 catalogs and Phillips-Madson and Malo (in Tollefson, Garrett, & Ingram,

1999), all the community colleges had economic development as an aspect of their missions.

Respondents' Suggestions

At the end of the questionnaire, space was provided to respond to an open-ended request: "Please suggest up to three ways to improve the relationship between the college and the incubator, with the most important one first." As mentioned in chapter three, this qualitative component can identify possible ways to improve the relationships between the community colleges and the business incubators. In all survey sites, both tenants and administrators responded to this request. The direct quotations (not edited for grammar mistakes) of community college suggestions were grouped into the following categories, based on the number of responses: college student and professor involvement; small business classes, workshops, and seminars; partnership and sharing agreements; joint meetings between tenants and community college personnel; incubator promotion through the community college; and miscellaneous suggestions.

In regard to college student and professor involvement category, the most frequent responses provided the following suggestions:

"Allows release time for faculty and staff to work with incubator tenants."

"Provide student assistance to incubator tenants."

Other responses collected in this category were:

"Improve "business smarts" of faculty and staff (many are naïve about real world)."

"Involvement by tenured faculty."

"Instructors hold monthly workshops/seminars useful to businesses."

"Provide co-op credit to students who assist tenants with research, etc."

In regard to the small business classes, workshops, and seminars category, most of the respondents suggested some kind of educational offering. One repeated response suggested to:

"Offer computer software courses on site."

Other respondent suggested the colleges should:

"Offer money management classes at no cost and other basic classes on site."

"Allow on-site instructors of classes to teach for incubator tenants."

"Offer some workshops!"

In regard to the partnership and sharing agreements category, one respondent suggested:

"A partnering with the college would be helpful in training and recruiting."

Other suggestions collected in this category were:

"Include incubator tenants in the bidding process for college contracts or subcontracts."

"College needs to market itself to business owners."

In regard to joint meetings between tenants and community college personnel category, one respondent provided the following suggestion:

"Conduct regularly scheduled meetings between the college administration and the incubator tenants to identify areas of common interest and joint initiatives."

Another respondent specified that these meeting be

"Collaboration/networking meeting or quarterly or semi-annual meetings between business owners and colleges."

In regard to the category of incubator promotion through the community college, one respondent suggested that the community college:

"Continuously promote the presence of the incubator in public relations efforts."

Other respondent suggested that the community college:

"More aggressively publicize what the community college is currently doing to support the incubator."

"Take a more proactive role in promoting what the center has to offer and in surveying incubator businesses and publishing the results, perhaps via seminars and group meetings of incubator tenants."

In regard to miscellaneous suggestions, there were numerous ideas that did not fit into the above categories. Some of the responses were:

"Make sure the community college point of contact for incubator support is known to incubator tenant owners."

"Make sure SBDC (Small Business Development Center) is very involved."

"Make sure everyone on campus knows that we (incubator) exist and where and how to find us."

"Provide financial support from college(s) for direct use to expand tenant services."

"Share research on status of regional economy."

"Make firm commitment to support incubator program and tenants in appropriate areas."

"Confer with incubator staff regularly."

"Provide funding for new and updated equipment."

"Share college resources with incubator tenants.

Resources equal: internet access, equipment, etc."

Chapter 4 presented a statistical analysis of the quantitative data and a brief qualitative summary of some the suggestions. Conclusions and recommendations drawn from this analysis are presented in Chapter 5.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The primary purpose of this study was to ascertain the overall role of local community colleges in existing Tennessee business incubation development. The study examined the perceptions of administrators associated with business incubators in comparison with the perceptions of incubator tenants regarding the community colleges' accomplishing activities and their respective importance related to existing Tennessee business incubators. These 17 activities were grouped into three roles (employment skill development, economic development, and incubator management), which composed the overall role of local community colleges' involvement with business incubators.

Additionally, the study examined the differences between those perceptions of accomplishments and their importance. A review of personal and institutional characteristics provided a profile of the respondents and the related community colleges. Further examination of the personal factors and institutional factors were analyzed in connection to the three overall community college's roles of employment skills development, economic development, and incubator management.

Data for the study were collected through the use of a coded questionnaire. Each code number designated the particular

business incubator site and whether the questionnaire was being completed by an administrator or a tenant. All site directors were guaranteed that identification of the sites and respondents would be confidential. The questionnaires were mailed to or personally delivered to the incubator directors for distribution. Some of the directors requested that they receive the questionnaires prior to a personal visit. The directors selected the respective administrators associated with the local community colleges.

All the physical sites were visited. Although some of the responses were retrieved on those visits, only through repeated requests over several months was a reasonable response rate achieved. Although the pilot study contributed to streamlining the questionnaire, a positive attitude as to the importance of this statewide survey was conveyed in the personal visits, the participants (especially the tenants who were trying to survive in the frantic business start-up stage) are very independent and busy individuals who tend to avoid such paperwork. The achieved 62% response rate was the best possible response, considering the reluctance of the population to complete surveys. A response rate of more than 30% was considered quite good for applied research (A. Czuchry, personal communication, February 5, 2001; Small & Yasin (1997); Yasin, Small, & Wafa (1997)). Other community college economic development quantitative studies using

administrators and businessmen had lower response rates. For example, there were a 45% rate by Allbright (1990) and a 57% rate by Chen (1995). Considering the population, this community college/incubator response rate represented a strong data base for the study.

The questionnaire was designed in two parts. Part I collected demographic data required to develop a profile of the participants and to provide data needed for analysis and discussion. Institutional data were collected based on the questionnaire codes identifying the site and whether the respondents were administrators or tenants. Part II used a five-point Likert-scale to measure participants' perceptions of the community colleges' accomplishing activities related to the business incubator and the importance in accomplishing those activities. For the purpose of this dissertation, responses of the Likert-scale were treated as an interval scale. The activities were grouped in three roles (employment skill development, economic development, and incubator management). A suggestion section in Part II allowed the respondents to suggest ways to improve the relationship between the college and the incubator.

Quantitative statistical methods used in this study included descriptive and inferential analysis. For significance testing, Alpha levels were set at .05 for all data analyses.

Data analysis of questionnaire results was performed using the Statistical Package for the Social Science (SPSS). Qualitative measures used in this study included the use of the suggestions from Part II of the questionnaire.

Conclusions

Economic development initiatives have been developing as an important and integral part of the American community college mission. The role of the community colleges in business incubation can serve as one basis for assessing the colleges' economic development contribution. The findings of this Tennessee study indicate that administrators associated with incubators and the incubator tenants basically agreed on their perceptions of the current role of community colleges in accomplishing activities supporting this economic development initiative. Both groups also agreed on the importance of these activities to the incubation effort.

The following presents the conclusions drawn from research questions examined in this study. The conclusion statements follow the order of the questions posed in Chapter 1.

Research Question #1: How well are local community colleges accomplishing activities related to business incubators?

The findings of this study strongly support the need for increased community college attention to accomplishing activities related to Tennessee business incubators. Over 50% of the survey participants recorded that the local community college was not fulfilling the desired level of accomplishment of a majority of the activities. The activity that the respondents were least dissatisfied with was providing consultative services to assist the incubator tenants (12% of the respondents marked "low" or "very low" for that activity). Most of the Tennessee community colleges (including the ones in this study) have branches supporting the state-funded Tennessee Small Business Development Center program. It has been through that office that the incubator small business owner usually has received consultation, rather than directly from the college. When tenants need help in solving the business and technical problems associated with their entrepreneurial ventures, they have generally not been getting such help from the community colleges.

One strategy to improve community colleges' consulting support may be for the community colleges to provide business mentors with real world business skills and engineering technology. One of the incubators studied has created a link

between state-of-the-art internet technology developed by college faculty mentors and struggling entrepreneurs with proven commercial success. Tenants gain help in solving complex media technical problems, and faculty gain real world examples that can be used in the classroom.

The Chapter 2 literature review supported the accelerating demand for community colleges to demonstrate that economic development has become a vital aspect of their mission (Bogat, 1994; Champion, 1995; Hite, 2000; Ingram, 1999; Grubb, Badway, Bell, Braggs, & Russman, 1997; Katsinas, 1994; Phelan, 1994; Schuyler, 1997; Zeiss, 1994). New businesses and jobs being created in a proven enhanced environment of a business incubator can be a quantifiable indicator of economic development effectiveness (Davis, 1999; Harper, Bislason, Livingston, & Liske, 2000; Hayes, 1997; Pare, 2000). If the local community has determined the need for a business incubator as an economic development tool, the findings of this study can be used by community college administrators to garner support for the inclusion of incubator supporting activities into community college development plans. By having a more supportive role in business incubation, the community colleges can display to the public its commitment to economic development.

Research Question #2: Are there differences between administrators associated with business incubators and incubator tenants regarding their perceptions of how well the local community college is accomplishing the activities related to business incubation?

Both Chi-square analysis and comparisons of tenants' and administrators' means for each of the 17 activities of the questionnaire were used to analyze this research question. For 10 activities, the Chi-square analysis produced no significant difference between the perceptions of administrators and tenants. Three activities violated the assumptions of Chi-square and were labeled as "not applicable" and only four of the 17 activities were statistically significant. The findings of this research that there was no difference between administrators and tenants for the majority of the activities support Chen's research (1995). She found no significant difference between local stakeholders and community college administrators concerning community colleges economic development efforts. However, the above Chi-square findings were inconsistent with other studies comparing administrators and other participants' perceptions of community colleges economic development efforts (Bombardier, 1992; Allbright, 1990).

Although there was general agreement on the community colleges' roles in this incubator study, from the data presented

it can be concluded that certain activities contributing to the roles revealed various degrees of perceived accomplishment between the administrators and the tenants. Regarding the employment skill development role, on four of the five activities a majority of the administrators and about a third of the tenants registered a "low or very low" accomplishing response, indicating that the community college should be doing more.

Regarding the differences in the perceptions of administrators and tenants, there were some activities were more of the administrators perceived as not being accomplished than tenants. The activity that revealed the largest disagreement between administrators (73%) and tenants (31%) for the activity not being accomplished was activity #4: "providing community college instructors with release time from their teaching duties to work in the incubator companies to update their knowledge and skills". The administrators indicated that more support of this activity should be considered. The administrators (56%) also were more dissatisfied than the tenants (21%) with accomplishment of activity #8: "providing labor market information related to occupational trends to the incubator small business owners." In two activities, the tenants posted lower percentages of accomplishment approval than the administrators: activity #5: "providing courses/workshops upon demand for the incubator small business tenant owners and their employees" and activity #16:

"offering college personnel to serve on the incubator board of directors". If community colleges administrators want to better serve the needs of the incubator, both activities need to be considered for more support.

The difference in means between administrators and tenants supported the Chi-square analysis for the activities where there were statistically significant differences. In addition, activity #3: "assisting in on-the-job technical and apprenticeship-training in cooperation with the incubator small business tenant owners" posted the highest difference (.97) between administrators (2.17) and tenants (3.14) and showed that tenants perceived this activity being accomplished more than administrators. Therefore, administrators can conclude that this training effort is better regarded than they might believe.

Research question #3: Are there differences between administrators and tenants in their perceptions of how well community colleges are accomplishing each of the 17 activities and the activities' importance?

Analysis of data associated with perceptions of accomplishments and their importance indicated no significant difference between administrators and tenants perceptions of accomplishments and their importance. Although there was no statistically significant difference between administrators and

tenants, some of the high percents of importance exceeding accomplishment indicated that the respondents felt the activity needed more attention. In the previous research question discussion, the tenants gave higher marks to activity #3 assisting in on-the-job training than administrators. Regarding importance exceeding importance, this activity received the highest total percentage (64%). Therefore, it can be concluded that both tenants and administrators consider this activity as needing more attention. More training targeted to the specific needs of the incubator owners and employees (activity # 3) had the highest percentage (65%) for the tenants of needing more attention. Administrators (73%) realized that activity #4: providing instructors with release time was needed more attention.

An overall need to increase community college activities for incubators was especially highlighted by the means of the difference between accomplishment and importance. As mentioned earlier, a negative mean showed that the activity needs attention because it was regarded as more important than it being accomplished. All the means for total responses, tenants and administrators were negative. Therefore, in every activity, every respondent, no matter tenant or administrator, thought that the community college should be doing more for business incubators.

Research question #4: Are there differences between the overall accomplishment roles for employment skills development, economic development, and incubator management and the overall importance of these roles?

Analysis of data associated with perceptions of data associated with perceptions of accomplishments and their importance indicated no significant difference between perceptions of accomplishments and their importance for two of the three roles, employment skill development and economic development. From the data analysis, the incubator management role had a significant difference between perceived accomplishment and importance. This finding suggests that there is vagueness in how much community colleges should be involved with the management of business incubators. The Chapter 2 literature review supported the reluctance of community colleges to be involved in incubator management (Hernandez-Gantes, 1995) or private enterprise, in general (Vaughan, 1995). Perhaps, this unwillingness is related to a possible conflict of using public funds to support private enterprise.

Research question# 5: What are the relationships between the personal factors of a) years in the position, b) years associated with the incubator, and c) age with each of three overall accomplishment roles of employment skills development, economic development, and incubator management?

Most of the respondents shared the following common personal characteristics: a) had work in their present position for a relatively short time (median) b) had been associated with the incubator for two years or less (median of 2.0), c) are considered middle age (mean of 40). The most frequent age was 40 with the ages ranging from 18 to 70. The majority age of entrepreneurs has been that middle age group. These business owners have gained work experience and/or a skill that can be used in a developing small business (Ryan, Ray, & Hiduke, 1999).

A general analysis of the selected data revealed no significant relationship between the perceived accomplishments of the three overall community colleges' roles toward the incubators in regard to the respondents' years in present position, years associated with incubator, and age. Detailed analysis of each of the roles individually with each of the above demographic data indicated no significant relationship.

Research question #6: Are there differences in the personal factors of a) educational level and b) gender and the overall accomplishment roles of employment skills, economic development, and incubator management?

Considering the educational experience of the participants, the majority (90%) had attended some college. Therefore, the respondents were at least aware about collegiate processes. The respondents were almost evenly split, with a slightly higher proportion of males (52%) between males and females.

As noted in the conclusions to the previous research question, there was no statistically significant difference among respondents of different years in present position or age categories regarding their perceptions of community colleges' accomplishment of the three roles. There also was no statistically significant difference regarding the perceived accomplishments of community colleges toward the incubators and the respondents' education or gender. These findings are not consistent with research conducted by Chen (1995) whose North Carolina study indicated that the years in present position, level of formal education, and age significantly affected the respondents' perceived levels of satisfaction with the economic development strategies used by community colleges. Chen (1995) did not concentrate her study to just incubators, but all

economic development strategies and admitted that an earlier study based on the same general population (Boone, 1993) did not report the same demographic influencing trend.

Considering the data analysis of the previous research question and this research question, it can be concluded that there is a homogeneous population of individuals associated with Tennessee business incubators in regarded to the survey demographic findings. There are no significant differences between the demographic means or their relationships between and differences with the overall community colleges' roles toward Tennessee business incubators.

Research question #7: Are there differences in the institutional factors of a) location and b) mission statement and the overall accomplish roles of employment skill development, economic development, and incubator management?

There were two institutional factors analyzed: economic development as part of the college's mission and location (rural or urban). Since all the local Tennessee community colleges of the business incubators had economic development as part of their missions, there was no analysis required on that institutional factor.

Considering the location factor, the number of respondents from a rural community college areas (49) was one

more than the respondents from urban community college areas. Analysis of data associated with location indicated no significant relationship between the perceptions of community colleges accomplishing incubator related activities and the locations of the community colleges.

Recommendations

The results and conclusions of this study provide the basis for the following recommendations.

1. Administrative leaders at each community college should increase the time and money they devote to supporting their respective business incubator.
2. Each community college should use the assessment data from this study as a basis for a more detailed evaluation to develop or revise a strategic plan for business incubator support.
3. To ensure mutually beneficial support, community college administrators should establish more release time for faculty to work with incubator companies. Faculty with real-world business skills and engineering technology will be provided as mentors. Tenants gain help in becoming more commercially viable through the mentors' help in solving complex business and technical problems, and the

faculty gain real world examples that can be used in the classroom.

4. Community college administrators responsible for intern, apprenticeship, and co-operative programs should consider developing continuous contact with incubator directors and tenants regarding maximizing those programs.
5. If incubators or proposed incubators are located in community colleges' service areas, the colleges should determine with incubator governing boards, directors, and tenants what degree of community college management involvement is desirable and feasible.
6. Community colleges should consider offering more classes, workshops, and seminars on the incubator sites.
7. Incubator directors should share this survey information with local community colleges to better inform those colleges of the tenants' support desires and needs.
8. Further research needs to be done to determine actual reasons affecting perception and importance differences between the administrators and the tenants.
9. Further research also needs to be conducted on the specific gain that incubator tenants achieve from staff support by the incubator and/or community colleges.
10. The majority of the survey respondents had only been associated with the incubators for a relatively short

period. For this reason, a study should be repeated in five to 10 years to ascertain whether the perceptions of this study have persisted.

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APPENDIX A

ROLE OF COMMUNITY COLLEGES IN BUSINESS INCUBATORS SURVEY

PART I DIRECTIONS: Please check or fill in the appropriate response for each question in Part I. The survey is coded to identify the specific incubator site. All responses to this survey are considered confidential.

A. Position:

(Check more than one answer if appropriate)

1. ____ Community College Administrator
2. ____ Incubator Director/Staff
3. ____ Incubator Tenant Owner
4. ____ Incubator Tenant Employee

B. Years in present position_____

C. Years associated with incubator_____

D. Highest level of formal education:

1. ____ High school graduate
2. ____ Associate degree
3. ____ Bachelor's degree
4. ____ Some College
5. ____ Graduate/professional degree

E. Year of Birth 19____

F. Gender

1. ____ Female
2. ____ Male

PARTII: Please indicate the degree to which you believe your local community college fulfills each activity. The following are the degrees:

VERY LOW LOW MODERATE HIGH VERY HIGH NO OPINION
 1 2 3 4 5 NO

First, respond as the activity corresponds to your evaluation of how well the community college is accomplishing its roles. Respond by filling in either 1, 2, 3, 4, 5, or circling NO at the end of the statement.

Second, respond how “important to do” the activity is to you by providing your opinion in the same manner as the first response, by filling in either 1, 2, 3, 4, 5, or circling NO at the end of the statement.

NO OPINION							NO
(5) VERY HIGH							5
(4) HIGH						4	
(3) MODERATE					3		
(2) LOW				2			
(1) VERY LOW			1				
The role of the local community college in Employment Skill Development:							
1.) Conducting training and retraining programs on-site relevant to the specific needs of the incubator tenant small business owners and their employees.	Accomplishing	①	②	③	④	⑤	NO
	Important to do	①	②	③	④	⑤	NO
2.) Providing general basic skills (math, communications, and decision-making) training to the incubator small business owners and their employees.	Accomplishing	①	②	③	④	⑤	NO
	Important to do	①	②	③	④	⑤	NO
3.) Assisting in on-the-job technical and apprenticeship-training in cooperation with the incubator small business tenant owners.	Accomplishing	①	②	③	④	⑤	NO
	Important to do	①	②	③	④	⑤	NO

4.) Providing community college instructors with release time from their teaching duties to work in the incubator companies to update their knowledge and skills.	Accomplishing	①	②	③	④	⑤	NO
	Important to do	①	②	③	④	⑤	NO
5.) Providing courses/workshops upon demand for the incubator small business tenant owners and their employees.	Accomplishing	①	②	③	④	⑤	NO
	Important to do	①	②	③	④	⑤	NO
NO OPINION							NO
(5) VERY HIGH							5
(4) HIGH							4
(3) MODERATE							3
(2) LOW							2
(1) VERY LOW							1
The role of the local community college in Economic Development through:							
6.) Providing consultative services (e.g. financial resources management business planning, operations strategy, and marketing planning,) to assist in solving problems for the incubator small business owners.	Accomplishing	①	②	③	④	⑤	NO
	Important to do	①	②	③	④	⑤	NO
7.) Providing student intern or co-op opportunities for the incubator small business owners.	Accomplishing	①	②	③	④	⑤	NO
	Important to do	①	②	③	④	⑤	NO
8.) Providing labor market information related to occupational trends to the incubator small business owners.	Accomplishing	①	②	③	④	⑤	NO
	Important to do	①	②	③	④	⑤	NO
9.) Operating a resource library at the incubator site for the use of the incubator tenants.	Accomplishing	①	②	③	④	⑤	NO
	Important to do	①	②	③	④	⑤	NO

10.) Operating a small business center at the incubator site for the use of the incubator tenants.	Accomplishing	①	②	③	④	⑤	NO
	Important to do	①	②	③	④	⑤	NO
11.) Assessing the status of the regional economy (such as in areas of unemployment, growth patterns and so forth) and providing updated information to the incubator small business owners.	Accomplishing	①	②	③	④	⑤	NO
	Important to do	①	②	③	④	⑤	NO
12.) Publicizing research results on technical changes, and business studies to incubator small business owners.	Accomplishing	①	②	③	④	⑤	NO
	Important to do	①	②	③	④	⑤	NO
13.) Acting as a catalyst/leader in organizing a master plan for economic development problems in the incubator area.	Accomplishing	①	②	③	④	⑤	NO
	Important to do	①	②	③	④	⑤	NO
NO OPINION							NO
(5) VERY HIGH							5
(4) HIGH							4
(3) MODERATE							3
(2) LOW							2
(1) VERY LOW							1
The role of the community college in Incubator Management through:							
14.) Forming partnerships with incubator small business owners.	Accomplishing	①	②	③	④	⑤	NO
	Important to do	①	②	③	④	⑤	NO
15.) Using an incubator advisory committee to maintain the linkage between incubator small business owners and the community college.	Accomplishing	①	②	③	④	⑤	NO
	Important to do	①	②	③	④	⑤	NO
16.) Offering college personnel to serve on the incubator board of directors.	Accomplishing	①	②	③	④	⑤	NO
	Important to do	①	②	③	④	⑤	NO
17.) Providing staff services to the incubator small business owners.	Accomplishing	①	②	③	④	⑤	NO
	Important to do	①	②	③	④	⑤	NO

Please suggest up to three ways to improve the relationship between the college and the incubator, with the most important one first:

1. _____

2. _____

3. _____

This survey instrument was based on the surveyor's experience and the dissertation findings of Dayang Chen (1995), Factors associated with community college administrators' and local stakeholders' perceived satisfaction with the economic development strategies used by community colleges in Maryland, South Carolina, and Virginia and Bruce Allbright (1990), Role of community colleges in economic development as perceived by community college administrators, community college teachers, and business and industry representatives.

APPENDIX B

INITIAL COVER LETTER FOR INSTRUMENT

Dear XXXXX,

I am a doctoral student at East Tennessee State University and I need your help to complete my dissertation on Tennessee community college participation in business incubators. As the Northeast State Technical Community College business management department head, I have been facilitating the establishment of a business incubator network in this region. The purpose of this study is to determine the perceptions of the role of community colleges in economic development through the establishment and maintenance of business incubators.

I am requesting all Tennessee administrators whose responsibilities are related to Tennessee business incubators and incubator small business owners to complete the questionnaire on the role of community colleges in business Incubators. The survey is coded to identify the specific incubator site. All responses to the survey are considered confidential.

Please return the survey to me in person or in the enclosed self-addressed, postage paid reply envelope by XXXXXX. If you have any questions call me at (423) 323-3191, Extension 3389. Thank you for your assistance.

Sincerely yours,

Garry Grau

APPENDIX C

FOLLOW-UP LETTER

Dear XXXXX,

A questionnaire on the Role of Community Colleges in Business Incubators was recently sent to you requesting completion and return by XXXXXXXX. The purpose of the study is to determine the perceptions of the desired role of community colleges in incubator establishment and maintenance by community college officials and the incubator small business owners.

I am sending another questionnaire, please take a few minutes to respond and return it in the reply envelope that was sent with the questionnaire. As stated in the first sent questionnaire, all individual replies are confidential and the replies are code sorted to just identify the incubator site. If this letter has crossed your response in the mail, please accept my apology.

Thank you for assisting in this research.

Sincerely yours,

Garry Grau

VITA

GARRY GRAU

Personal Data: Date of Birth: September 13, 1946
Place of Birth: Indianapolis, Indiana
Marital Status: Married

Education: Central Missouri State University,
Warrensburg, Missouri; English and Social
Studies, B.S.E., 1968
Washington State University, Pullman,
Washington; History, M.A., 1973
Stetson University, Deland, Florida;
Business Administration, M.B.A., 1984
East Tennessee State University, Johnson
City, Tennessee; Educational Leadership,
Ed.D., 2001

Professional
Experience: Teacher, Missouri and Florida public
schools; 1968-1982
Material Operations Supervisor, ITT Defense
Communications Division; Cape Canaveral,
Florida, 1982-1987
Administrative Manager, SPS; Indialantic,
Florida, 1987-1991
Operations Manager, Fleming Manufacturing;
Cuba, Missouri, 1991-1993
Instructor, Northeast State Technical
Community College; Blountville, Tennessee,
1993-1997
Assistant Professor and Business Management
Department Head, Northeast State Technical
Community College; Blountville, Tennessee,
1997-present

Honors and
Awards: Multiple year honoree in Who's Who Among
America's Teachers.
Who' Who Among International Entrepreneurs.
ETSU's Phi Kappa Phi.
Repeated Nominee, NSTCC Outstanding Faculty
Member.
1998 Outstanding Organization Management
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1979 Teacher-of-Year, Crawford R-II H.S.
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