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MEASURING INNOVATION: THE USE OF INDICATORS IN DEVELOPED COUNTRIES

HANADI MUBARAK AL-MUBARAKI*

Kuwait University, Kuwait

*College of Engineering and Petroleum, Kuwait University,
P.O. Box 39964, Nuzha, Kuwait
E-mail: dralmubaraki@live.com*

ALI HUSAIN MUHAMMAD

Kuwait University, Kuwait

*College of Business Administration, Kuwait University, Kuwait
E-mail: ali@cba.edu.kw*

MICHAEL BUSLER

Richard Stockton University, USA

*Department of Business Administration,
Richard Stockton University, Galloway, NJ, USA
E-mail: michael.busler@stockton.edu*

ABSTRACT

Purpose: The purpose of this paper is to describe and identify the ranking of innovation program landscape in the United Kingdom (UK). The identification will focus on the average of four categories: policy, culture, economy and industry.

Design/methodology/approach: The nature of this research is mainly qualitative. This investigation uses two semi-structured interview based in the UK, combined with an examination of organisational documents.

Findings: The research findings indicated highest ranking of the Petchey Centre of Entrepreneurship located in University of East London present culture 60%, policy 75%, industry 80% and economy 100%.

Conclusion: The authors conclude with several recommendations for academia and practitioners such as governments, policy makers, funded organisations and strategic institutions.

Keywords: innovation; technology commercialisation; entrepreneurship; incubators; economic growth.

*Corresponding author

INTRODUCTION

The Organisation for Economic Cooperation and Development (OECD, 2010) defines innovation as the implementation of a new or significantly improved product, service or process; a new marketing method, organisational method in business practices, workplace organisation or external relations. There are many researchers discussed the role of innovation in developed and developing countries (Arocena and Sutz, 2000; Astrid et al., 2009; Cassiolato et al., 2003; Lundvall et al., 2009). Although, innovation is vital to spur economic growth and to raise living standards. Also, economies are becoming more knowledge-based, where innovation is the driver of long-term economic growth. Most of higher Research and Development (R&D) used innovation, productivity, and per capita income toward to long-term growth (Hall and Jones, 1999; Rouvinen, 2002).

The objectives of this paper is to describe and identify the ranking of innovation program landscape in the United Kingdom (UK). The identification will focus on the average of four categories: policy, culture, economy and industry.

The structure of this paper is as follows: Section 2 provides a literature review of the innovation program. Section 3 provides the research methodology included the evidence from the literature review and the UK interview of the two innovation program. In Section 4, the authors briefly discuss the findings of the study drawn from qualitative analysis of innovation. Section 5 concludes with implications of innovation in developed countries.

LITERATURE REVIEW OF INNOVATION

Al-Mubarak et al. (2014a) indicated that the research used qualitative approaches of the innovation program landscape in the UK. The research findings indicated high ratings for indicators in all four categories of culture, policy, economy, industry, averaging 90%, 90%, 90% and 100%, respectively. In addition, Al-Mubarak et al. (2014b) showed the results of qualitative research of St. John's Innovation Center based in UK. Specifically, the categories of policy and industry received ratings of 80%, with each of the four indicators in those two categories also receiving ratings of medium. The categories of culture and economy received ratings of 95%. For each of those categories, three indicators received ratings of high and one received a rating of medium. None of the indicators received a rating of low. Therefore, the program at St. John's Innovation Centre can be described with the highest emphasis on the indicators: creativity, innovation, entrepreneurship, survival rate, jobs creation and startup companies. Of secondary importance, but still significant, were the indicators: training program, government role, role of university, strategic focus, incubators funding, incubators type, incubators services, incubators size, new products and number of patents. Thus, while significant levels of attention are given to the development of policy to support innovation and efforts to track the progress of innovation efforts by means of industry variables, even greater attention is given to the creation of a culture to support innovation and measures of the overall impact of innovation on the Economy.

Al-Mubarak and Busler (2009) indicated that Innovation centres provide entrepreneurs with expertise, networks and tools they need to make their ventures successful the study discussed European models based on their adoption as case study examples: the UK, France and Germany. They account for 83% of all the incubators located throughout Europe today. Although, Al-Mubarak and Busler (2010a) indicated that innovation programs can help young firms to survive and grow during their start-up years, and can play a key role in the economic development of a community or region. Moreover, Al-Mubarak and Busler (2010b) considered innovation centres as cost-effective economic development processes. Innovation could be an effectual driver for

economic development at appreciably higher cost than originally anticipated unless a thorough and objective feasibility study is planned, performed and best-practice is applied.

According to the European Business and Innovation Network (EBN, 2012) indicates the percentages of the groups of innovation as divided in Europe into three groups: technological innovation 51.49%, non-technological innovation 38.34% and non-innovation 10.16%. The main focus of Business Innovation Centers (BICs) was to support start-ups firms. In fact, BICs supported 2491 companies and requested 666 patents for companies and entrepreneurs, resulting in a 307 granted patents.

Several studies used the combination of Science, Technology and Innovation (STI) as an indicators and the used of science and technology can contributed positively on the social and economic which business competition is increasingly based on innovation (Freeman and Soete, 2009; Godin, 2007; Sagasti, 2004). Furthermore, European countries used innovation indicators as methodology, for example, European Innovation Index have been published (EC, 2001, 2005, 2006, 2007; OECD, 2005). Finally, Japan used S&T activities includes inputs in R&D, staff, output and number of scientific paper citations as ranking multiplicity of indicators (Kodama, 1987; Niwa and Tomizawa, 1995, 1996).

RESEARCH METHODOLOGY

Insights from the literature review were combined with analysis of the interviews to measure the performance of each program to provide an in-depth understanding of the research landscape and a rich insight into the research objectives (Eisenhardt, 1989; Yin, 1994). The international interview design is based on two charts. Firstly, the radar chart consists of four categories:

1. culture;
2. policy;
3. industry and
4. economy.

In addition, each category is measured by four indicators and each indicator is rank-ordered as an independent variable [e.g. low (L), moderate (M) and high (H)] with total of 16 indicators. Secondly, the average for each category is measured on a scale of 100% and the average for each indicator is measured on a scale of 25%. There are three groups of outcomes, for example, a total percentage of categories between 80% and 100% indicated a high outcome, a total percentage of categories between 60% and 79% indicated medium outcomes, and a total percentage of categories less than 60% indicated low outcomes (See Figure 1).

FINDINGS AND DISCUSSIONS

From the current literature, it is evident (see Section 2 above) Innovation is the driver of our future growth (EBN, 2010; EC, 2010; Eshun, 2009; EURP, 2010; White House, 2010). This requires improving the quality of our education, strengthening our research performance, promoting innovation and knowledge transfer, making full use of information and communication technologies, and ensuring that innovative ideas can turn into new products and services that create growth, quality jobs and help address global societal challenges. However, to succeed, this must be combined with entrepreneurship, finance, and a focus on user needs and market opportunities (EC, 2010).

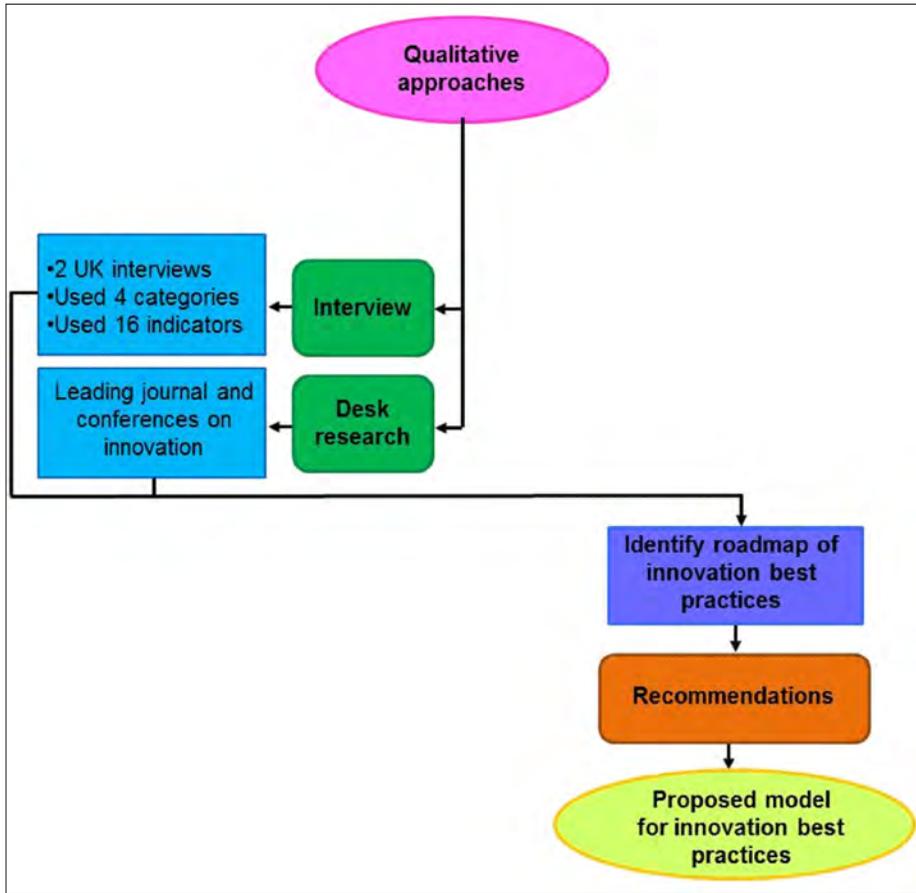


Figure 1 Research methodology

Furthermore, innovation-based incubators are local economic development tools (Al-Mubarak and Busler, 2009, 2010a; Al-Mubarak et al., 2014; Eshun, 2009; EURP, 2010), which innovation-based incubators support innovative business projects, which could be either technologically-oriented or non-technologically oriented (EC, 2010). Incubators provide new high-tech venture creation, technological entrepreneurship, commercialisation and transfer of technology (Al-Mubarak, 2008; Al-Mubarak and Busler, 2011a–c; Al-Mubarak et al., 2014; Mian, 1994, 1997; McAdam and McAdam, 2008; Phillips, 2002).

Interview 1: The Petchey Center of Entrepreneurship, University of East London, UK

Chart 1 shows the ratings for The Petchey Center of Entrepreneurship, University of East London. Two of the four categories-culture and policy-received high ratings, and the other two-industry and economy-received medium ratings. Only three indicators received low ratings-incubator funding, number of patents and new products.

Similarly, Table 1 presents the average of indicators as the result from the radar chart, at 78%, which indicated an average outcome in the medium range. The percentage of each category from the radar chart indicated ratings for culture, policy, industry and economy of 85%, 85%, 70% and 70%, respectively (See Chart 2).

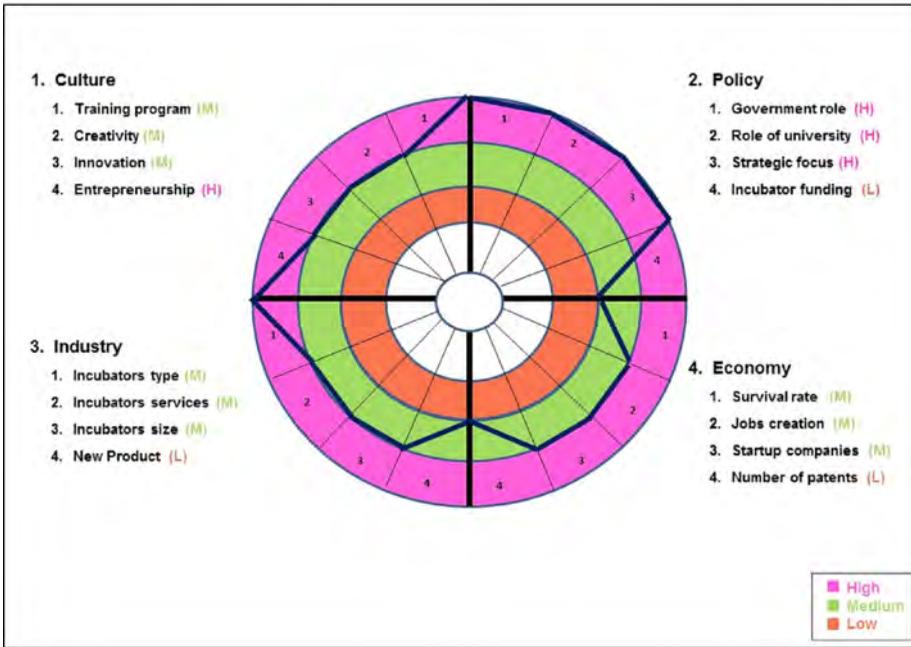


Chart 1 Radar chart of The Petchey Center of Entrepreneurship, University of East London

Table 1 Result of average indicators of The Petchey Center of Entrepreneurship, University of East London

	% 100	Scale			Indicators %	Total categories %
		High (25%)	Medium (20%)	Low (10%)		
<i>Culture</i>	100					
1. Training program	25		20		20	
2. Creativity	25		20		20	
3. Innovation	25		20		20	85
4. Entrepreneurship	25	25			25	
<i>Policy</i>	100					
1. Government role	25	25			25	
2. Role of university	25	25			25	
3. Strategic focus	25	25			25	85
4. Incubator funding	25			10	10	
<i>Industry</i>	100					
1. Incubators type	25		20		20	
2. Incubators services	25		20		20	
3. Incubators size	25		20		20	70
4. New product	25			10	10	
<i>Economy</i>	100					
1. Survival rate	25		20		20	
2. Jobs creation	25		20		20	
3. Startup companies	25		20		20	70
4. Number of patents	25			10	10	
Total	400					310
Average	100%					77.5%

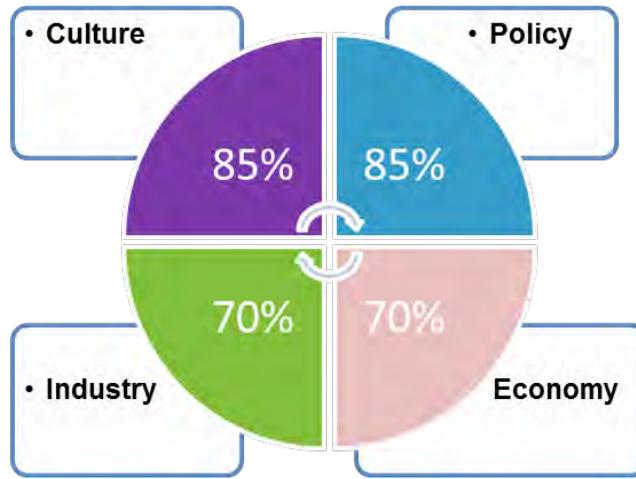


Chart 2 Percentage of total outcomes from radar chart

Interview 2: University of Birmingham, UK

Chart 3 shows the ratings for the University of Birmingham, UK. Two categories, industry and economy, received high ratings, the category of policy received a medium rating and the category of culture received a low rating. Three key performance indicators received low ratings- entrepreneurship, strategic focus and creativity.

Table 2 presents the ratings as the result from the radar chart, with an average of 79%, which indicated an average outcome in the medium range. The economy category received a rating of 100%. However, the policy, culture and industry categories received ratings of 75%, 60%, 80%, respectively (See Chart 4).

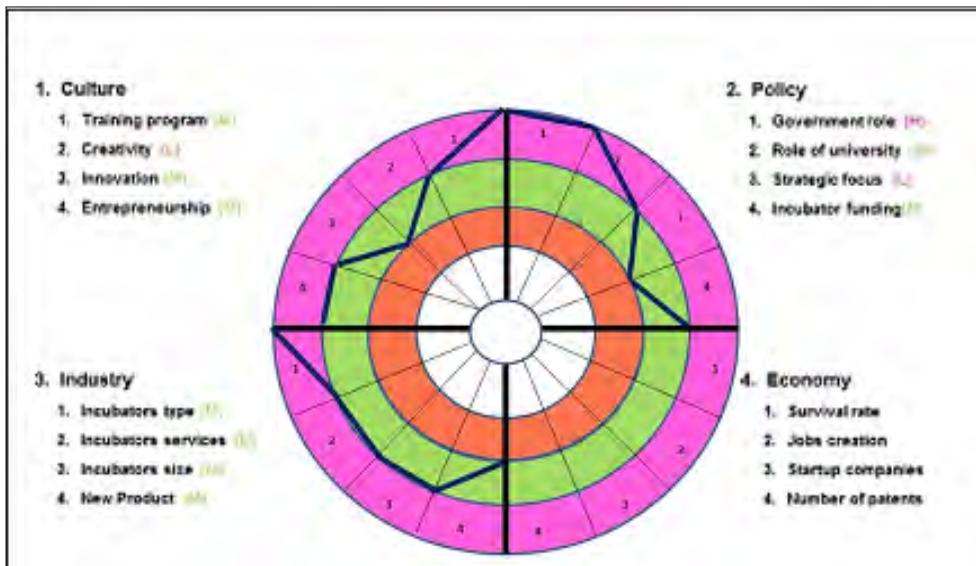


Chart 3 Radar chart of University of Birmingham, UK

Table 2 Result of average indicators of University of Birmingham, UK

	% 100	Scale			Indicators %	Total categories %
		High (25%)	Medium (20%)	Low (10%)		
<i>Culture</i>	100					
Training program	25		20		20	
Creativity	25			10	10	
Innovation	25		20		20	60
Entrepreneurship	25			10	10	
<i>Policy</i>	100					
Government role	25	25			25	
Role of university	25		20		20	
Strategic focus	25			10	10	75
Incubator funding	25		20		20	
<i>Industry</i>	100					
Incubators type	25		20		20	
Incubators services	25		20		20	
Incubators size	25		20		20	80
New product	25		20		20	
<i>Economy</i>	100					
Survival rate	25	25				
Jobs creation	25	25				
Startup companies	25	25				100
Number of patents	25	25				
Total	400					215
Average	100%					79

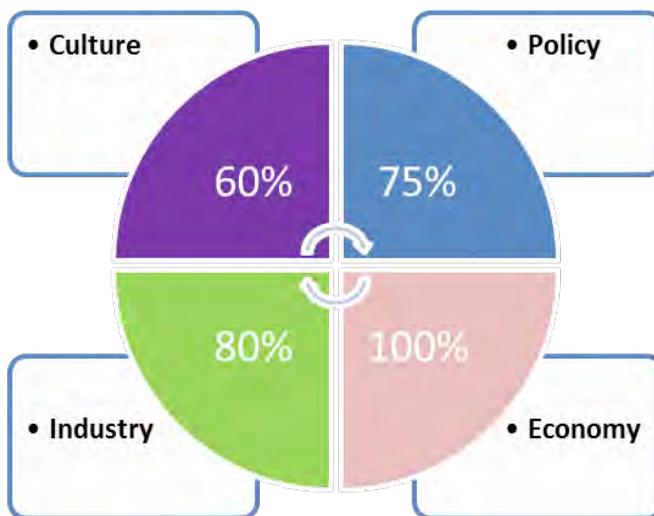


Chart 4 Percentage of total outcomes from radar chart

Table 3 Summary of interviews

Interview	Culture %	Policy %	Industry %	Economy %	Average %	Scale*	Rank
Birmingham University, UK	60	75	80	100	79	Medium	1
The Petchey Center of Entrepreneurship, University of East London, UK	85	85	70	70	78	Medium	2

*Scale high ranged 81–100%, scale medium ranged 41–80%, scale low ranged less than 41%.

SUMMARY OF INTERVIEWS

Table 3 presents the interview ranking of two selected innovation centres. The Birmingham University, UK presents the highest rank with an average of 79%. However, The Petchey Center of Entrepreneurship, University of East London, indicated second ranking.

CONCLUSIONS AND REFLECTION

Based on the analysis of the interviews we have identified many areas of opportunity for enhancing the work of innovation centres and business incubators in developed countries. Following are the recommendations:

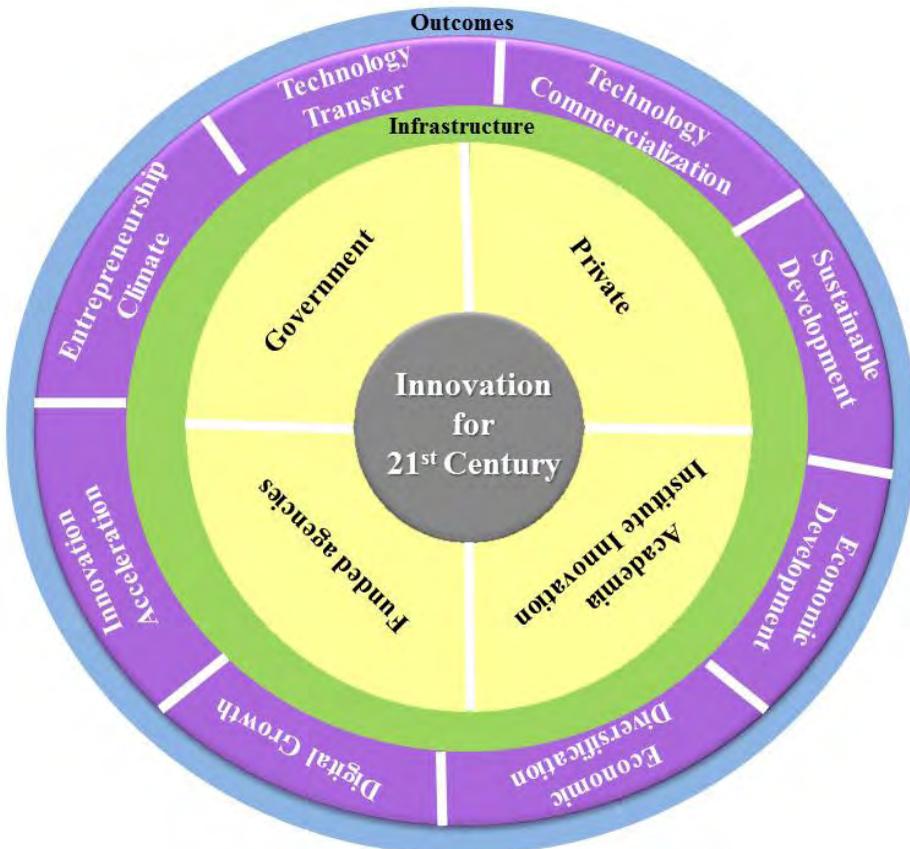


Figure 2 The proposed model

1. Construct an innovation data bank for best practice models including successful case studies and outcomes to share the knowledge worldwide.
2. Construct a worldwide database of innovation to upload annual reports with data for each country to facilitate networking and exchange of information.
3. Promote innovation as a tool to strengthen the modern economy-based on the knowledge towards smart growth.
4. Provide incubator models with outcomes on innovation, entrepreneurship and job creation.
5. Innovation centres and incubation programs should evaluate their results annually and analyse their strengths, weaknesses, opportunities, and threats for continuing planning and improvement.
6. Focus on entrepreneurship as the most important element in generating innovation and economic growth including new firms, job growth and small businesses.

In conclusion, innovation programs are vital tools for economic growth, knowledge and technology transfer based on the several indicators such as creativity, entrepreneurship, survival rate, job creation, startup companies and number of patents. Future work can be continued from other regions such as the Middle East and South America which will fetch positive lessons that are valuable for future expansion and development of science park or innovation centre.

Finally, Figure 2 presents model of innovation strategy for 21st century with innovation infrastructure and innovation outcome, which contributed positively in developed and developing countries.

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BIOGRAPHICAL NOTES

Hanadi Mubarak AL-Mubarak is an Assistant Professor at Kuwait University. She teaches management courses for undergraduates and graduates. She has published scientific papers in many Academic Journals, and one book, and has presented her research papers in many countries. He is the Recipient of several international awards and medals for her contribution to International Scientific Research International Peace Prize–UN for Achievement and Masters Degree Honour Medal 1996–Kuwait University from HH Sheikh Jaber Al-Ahmed Al-Sabah, the Amir of Kuwait. He serves on the Editorial Board of international journals. She has substantial experience in research entrepreneurship in DC, Economic Development, Incubators, innovation and SD.

Ali Husain Muhammad is an Associate Professor of management and Head of the Management and Marketing Department in Kuwait University. He teaches management courses in the business school for undergraduate and graduate students. He has published scientific papers in different academic journals. He worked as Consultant in developing work systems and organisational structures for a number of public and private organisations in Kuwait. His research interests are in organisational development, organisational design and employees' attitudes and behaviour.

Michael Busler is an Associate Professor of Finance, Finance Track Coordinator and a Fellow at the William J. Hughes Center for Public Policy at Richard Stockton College. He teaches undergraduate courses in Finance and Game Theory as well as Managerial Economics and Corporate Finance in the MBA Program. He has been published in eight different academic journals and has presented his research in ten countries. In addition, he has worked as a Financial Analyst for Ford Motor Company and FMC Corporation and has been an entrepreneur, having owned several businesses, mostly in the real estate development field. He earned his Doctorate at Drexel University.