

2013

LMIP WORKING PAPER 6

Using the Delphi Method to Select Key Indicators for Skills Planning

Lizzy Mabotja

connecting capabilities individuals & institutions connecting capabilities individuals & ins

connecting capabilities individuals & institutions connecting capabilities individuals & ins



LABOUR MARKET
INTELLIGENCE PARTNERSHIP

Published by the Labour Market Intelligence Partnership (LMIP),
a research consortium led by the Human Sciences Research Council (HSRC)

www.lmip.org.za

Designed, typeset and proofread by COMPRESS.dsl

www.compressdsl.com

Disclaimer

The HSRC-led consortium has released these working papers to inform debate, encourage different thinking about social problems and stimulate the development of novel policies. These working papers do not themselves represent policy advice. The ideas, opinions, conclusions or policy recommendations expressed in these working papers are strictly those of the author(s) and do not necessarily represent, and should not be reported as, those of the HSRC-led consortium or DHET. The HSRC-led consortium and its funders take no responsibility for any content or syntax errors, omissions in, or for the accuracy of, the information contained in these working papers.

CONTENTS

ABBREVIATIONS AND ACRONYMS	IV
1. INTRODUCTION	1
2. OVERVIEW OF THE DELPHI METHOD	2
2.1 Definition	2
2.2 The basic Delphi process	2
2.3 Characteristics of Delphi	3
2.3.1. Structured information flow	3
2.3.2. Regular feedback	3
2.3.3. Anonymity of participants	3
2.4 Forms of Delphi	4
2.5 Advantages and disadvantages of the Delphi method	4
2.6 Rationale for using the Delphi method to select indicators	5
3. APPLICATION OF THE DELPHI METHOD	6
3.1 Using Delphi to select indicators for skills planning	6
3.2 Why the Delphi method?	6
3.3 Guidelines for applying the Delphi method	6
3.3.1. Define the problem	6
3.3.2. Formulate questions	7
3.3.3. Choose facilitator and specify responsibilities	7
3.3.4. Select participants	8
3.4 Questions, responses and moderation	9
3.5 Data analysis	9
4. REFERENCES	10

ABBREVIATIONS AND ACRONYMS

DHET Department of Higher Education and Training

KISP Key Indicators for Skills Planning

LMIs labour market indicators

LMIP Labour Market Intelligence Partnership

NGO non-governmental organisation

SETAs Sector Education and Training Authorities

1. INTRODUCTION

One of the signature projects of the Labour Market Intelligence Partnership (LMIP) between the Department of Higher Education and Training (DHET) and a research consortium led by the Human Science Research Council involves selecting a set of indicators to support skills planning in South Africa. This set of Key Indicators for Skills Planning (KISP) constitutes an analytical framework that will guide policy and resource allocation decisions aimed at improving skills supply and labour market efficiency in support of the national aspiration for inclusive and sustained economic growth. The KISP will be selected by a working group drawn from stakeholders in skills planning, including government, labour, the private sector and civil society groups.

Three sub-projects have been designed as precursors of the main KISP selection activity. These are:

- A comparative review of international indicator systems linked to skills planning;
- Development of a Compendium of Indicators; and
- An experimental sub-project to select indicators using Delphi methodology.

These projects have all been designed to feed into and enrich the main KISP selection process.

The sub-project based on the Delphi methodology involves a pilot study in which a group of experts have to address a complex problem through participating in a structured collaboration process. Participants are unaware of each other's identity and communicate their views using only e-mail, with a moderator who is the intermediary for group interaction.

This working paper explores how the Delphi method can be applied to selecting indicators for skills planning.

The first part of the paper presents a brief overview of the Delphi method and the underlying theory, including definitions of the method, its characteristics, its strengths and limitations, and the standard approach to its implementation. The second part proposes how the Delphi method can best be applied to the selection of core labour market or skills planning indicators in South Africa. The Delphi output will be used to guide the main working group in the selection of KISP.

2. OVERVIEW OF THE DELPHI METHOD

The Delphi method is a relatively new research method, which originated during the Cold War when the US devised the 'Delphi Project' to forecast the impact of technology on the development of military capabilities. Since the 1970s, Delphi has been used extensively in the field of public policy-making. Because it is versatile and adaptable, it has since been used in many fields of research such as public administration, economics, business, environmental management, education and health care (Miller 1993).

The Delphi method is a way of obtaining group input from a selected group of independent experts for problem-solving, without having to put the participants in one location. The Delphi method is particularly useful when the research problem 'does not lend itself to precise analytical methods; however it benefits from subjective judgements on a collective basis' (Linstone & Turoff 2002: 4). It has application whenever policies, plans or ideas have to be based on informed judgment. The method is applied mostly to conceptual issues rather than matters that require precise quantifiable 'solutions'.

2.1 Definition

A basic definition is that Delphi is a 'method for structuring a group communication process so that the process is effective in allowing a group of individuals as a whole to deal with a complex problem' (Linstone & Turoff 2002: 3).

2.2 The basic Delphi process

What follows is a description of a simple process that would apply to almost all implementations and types of Delphi. Essentially, the Delphi method is based on two or more rounds of participant responses to a carefully developed set of questions

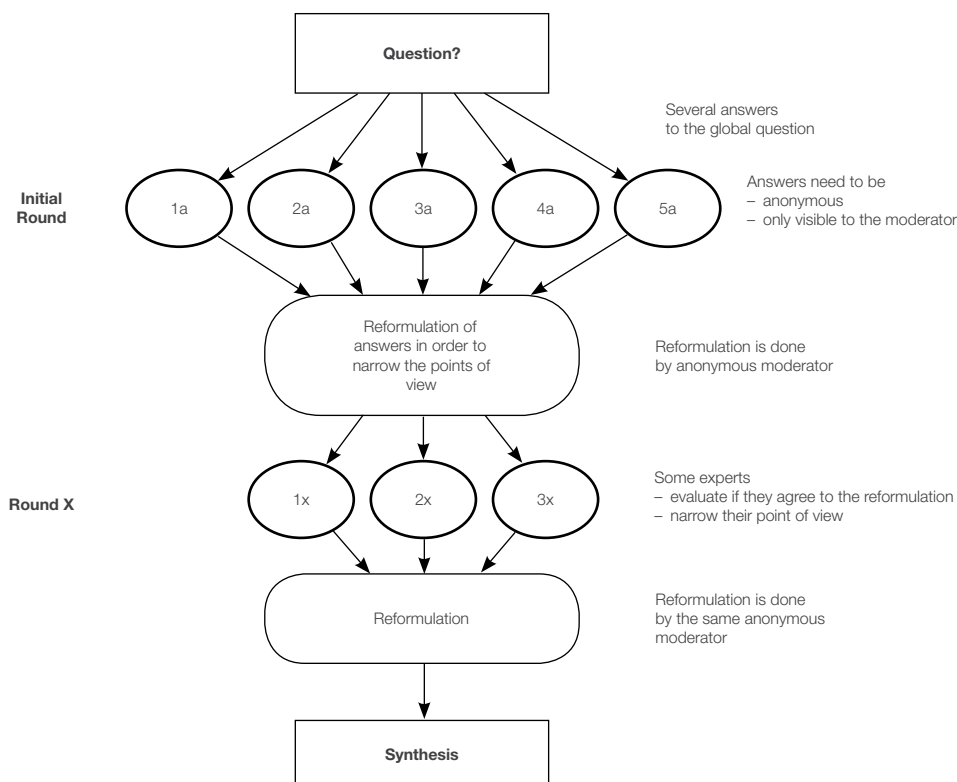
that addresses a pre-determined issue. Delphi questions are critically important as they must catalyse relevant and useful responses from the participants. Just as with traditional research, the Delphi questions must be concise, unambiguous and focused. If a series of questions is used, they should be designed in a logical progression that guides and advances discussion through a number of rounds towards a useful outcome that fulfils the anticipated goal of the process. Questions may be arranged in different ways that address the aims of Delphi and may be presented singly, in groups or in the form of a questionnaire.

A graphical depiction of the basic Delphi method is given in Figure 1. For simplicity's sake, the figure refers to a short process that requires participants to respond to a question (Initial Round) following which they respond to how the initial round responses were reformulated by the moderator (Round X).

The first step in using the Delphi method after developing a questionnaire or series of key questions is to distribute it to the members of the panel. This is the Initial Round, which requires that members of the panel independently respond to the questionnaire, express their individual ideas around the issue or problem at hand and return these to the moderator.

The moderator then summarises the responses to the Initial Round question, narrows down the points of view and sends a feedback report to the panel, this time adding a second question/questionnaire. With the help of the feedback report, the panellists may evaluate their responses and change their responses if they wish to do so. Panellists then separately respond to the second question/questionnaire. After the second round, the moderator develops a summary and feedback report for the panel members. A final report on the process

Figure 2: Delphi implementation



Source: Epicum (2011)

is then written and submitted. There may be variations to the procedure, such as incorporating different numbers of panellists and even more rounds of questions (Delbecq et al. 1975).

2.3 Characteristics of Delphi

The Delphi method is characterised by *structured information flow*, *regular feedback* and *anonymity of participants*. The role of the facilitator is central to the success of Delphi, as s/he must steer information flows, provide regular feedback to participants and protect their anonymity. These features help the participants to focus on the issue at hand, which separates Delphi from other methodologies.

2.3.1. Structured information flow

Structured information flow avoids possible confrontational face-to-face panel discussions. Contributions are directed to the facilitator, who controls interactions among participants. The contributions from the participants in the form of answers to a questionnaire are collated. The

facilitator processes the information and filters irrelevant content.

2.3.2. Regular feedback

The facilitator summarises individual contributions and allows participants to revise their own responses. All participants get an opportunity to comment on their own responses and those of others, as well as on the process of the panel as a whole. At any point participants can revise their earlier responses or comments.

2.3.3. Anonymity of participants

Anonymity of panel participants is guaranteed. AS there is no physical meeting, the method avoids the identity and personality of some participants dominating others. It frees participants to express their opinions, encourages open critique and minimises the impact of personal biases (Okoli & Pawlowski 2004). Participants' identity is never revealed – not even after completion of the final report. Not having actual meetings also means that the Delphi is not disadvantaged by the dispersed geographic location of its participants.

2.4 Forms of Delphi

Though the Delphi method remains basically the same, it can be applied to different analytic challenges. Delphi was originally a forecasting method in the fields of science and technology. The first form of Delphi was the *forecasting Delphi*, designed to combine expert opinions to predict the likelihood of future events in cases where current knowledge is limited or conflicting (Albright 2002; Coates et al. 2001; Ilbery et al. 2004). This is also referred to as the 'conventional' or the 'exploratory' Delphi.

In the 1970s, the method began to be applied to other fields related to public policy, economic trends, health and education. The *normative Delphi* is centred on establishing what is desirable in the form of goals and priorities. It attempts to structure a set of priorities which could be integrated into a normative future. It is focused on the exploration of what 'should be' in the context of current knowledge (Martino 1999).

The *policy Delphi* involves informed advocates and stakeholders as well as policy experts (Needham 1990). It deals with matters of political importance and contestation (Coates 1999; Critcher & Gladstone 1998; Linstone & Turoff 2002). Its aim is not to obtain consensus but to ensure that the range of politically relevant variables and contextual parameters are identified and explored. It has been successfully used in many developing countries as a tool to facilitate participatory policy-making and to identify the most urgent social and economic challenges. Many governments have argued in favour of the value of collective intelligence from civil society, academics and private-sector participants in the context of policy change (Hilbert et al. 2009).

In the policy space, Delphi method applications include the following (Linstone & Turoff 1975: 3):

- Evaluating possible government budgetary allocations;
- Exploring urban and regional planning options;
- Planning university curriculum development; and
- Delineating the pros and cons associated with potential policy options.

2.5 Advantages and disadvantages of the Delphi method

The Delphi method becomes an option when other empirically dependent methods of data collection are inadequate. It allows researchers to access independent yet informed opinions from experts in the field. 'Its capacity to capture those areas of collective knowledge that are held within professions but not often verbalised, makes it enormously useful' (Stewart 2010).

The main advantages of the Delphi method are:

- Anonymity of participants;
- Time and travel costs are ruled out as the process is conducted using e-mail;
- A wide spectrum of expert opinions, by encouraging the contribution of each participant; and
- Participants formulate their responses in the comfort of their own environment, affording them more room for reflection and scrutiny of their responses. This may increase the quality of the participants' input.

On the other hand, Delphi is not without its limitations:

- Moderator views and preconceptions of a problem can distort the responses of participants by overspecifying the structure of the process and by limiting contributions from dissenting perspectives related to the problem.
- Poor techniques of summarising and presenting the group response distilled from participants, as well as ignoring or not exploring disagreements on the part of the moderator may detract from the benefits of the technique.
- Relatively high written communication skills are required and should not be taken for granted in all respondents; these may not be easy to identify beforehand.
- Although it may seem straightforward, the Delphi is deceptively complex and will be unresponsive if mechanically implemented by the moderator who must apply it with an empathetic and analytic eye.

2.6 Rationale for using the Delphi method to select indicators

New applications of the Delphi method continue to be tested in relation to developing indicators:

- The Delphi method has been applied in the UK health sector for general practitioners to identify prescribing indicators.
- In South Africa the Delphi method has been applied in several healthcare research projects such as to assist with making recommendations regarding education and training for medical practitioners working in district hospitals (De Villiers et al. 2005).
- Delphi has also been applied in the tourism industry to predict future tourism potential by getting expert opinions on the development of indicators at a company level to measure movement of tourism products towards sustainability (Kaynak et al. 1994).

As noted above, one of the research projects in the LMIP is to develop a set of labour market indicators (LMIs) as an analytic tool to support skills planning. However, indicator development is vast policy

research domain with many diverse approaches and a wide array of possible indicators. Selecting a compact framework of core indicators for skills planning would have to accommodate a number of different perspectives. The Delphi method is mostly used in situations where imprecise, unknown or contradictory opinions exist, as is likely to be the case in the initial stage of indicator development (Cook et al. 2005: 6). This makes the methodology suitable for indicator selection.

This indicator selection project can benefit from acquiring expert opinion, encouraging a broad perspective of views and facilitating collective insights, opinions and judgement from a multidisciplinary group of panellists and informed professionals (McCluskey 2006). This is suited to the principles of the LMIP project of encouraging research partnerships and maximizing the inputs of all stakeholders.

For the purpose of this project, it is argued that the policy Delphi be applied because indicator selection addresses complex and broad issues relating to labour market and skills-planning policy.

3. APPLICATION OF THE DELPHI METHOD

3.1 Using Delphi to select indicators for skills planning

One of the tasks of the LMIP project is the development of indicators that will be useful to skills planners, policy-makers and researchers. As indicated earlier, the proposed 'Indicator Delphi' feeds into the broader Indicators Project, which is aimed at selecting a set of KISP and LMIs that would assist in 'establishing a foundation for labour market information systems in South Africa' (DHET 2009: 30). This section outlines how the Delphi method would be applied to the indicator selection project.

The following questions inform the indicator selection process in the LMIP:

- What set of indicators should be incorporated in an indicator framework for monitoring the performance of the South African labour market to 2025?

- What comparative systems of LMIs are favoured internationally by countries with similar labour market challenges to South Africa?
- What methodologies would be suited to the process of selecting core LMIs for the DHET?

Figure 2 highlights the different components that will be used to guide the LMIP indicator selection process. The focus here is on the Delphi process (in dotted line), which provides an external view from a group of experts. It is not the solution but a contribution towards selection.

3.2 Why the Delphi method?

There are various possible methodologies that can be employed for this study. After careful consideration of the nature of the study, the Delphi policy was selected as the most suitable methodology:

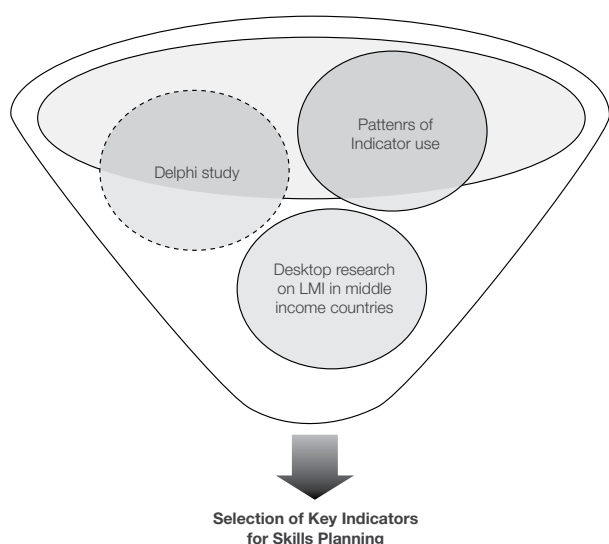
- It affords the research an opportunity to foster communication and debate between researchers, policy-makers, stakeholders and partners;
- It is inclusive and consultative –characteristics necessary for policy development; and
- It supports the creation of new knowledge by putting together a diverse group of intellectuals to tackle one issue from different perspectives.

3.3 Guidelines for applying the Delphi method

3.3.1. Define the problem

The crucial first step in the Delphi process is to define the problem in a clear, simple manner to ensure that all panellists understand and identify with the problem and commit to participating. The overarching problem of the Indicator Delphi is to

Figure 2: Components of the LMIP KISP selection process



assist government in the planning process through developing analytical frameworks for skills planning. We need a strong skills-planning mechanism that is based on credible information and data, and which can be tracked and monitored through a core set of indicators. In this context, a coherent set of relevant indicators would serve as one example of an analytical framework to support skills planning.

The Indicator Delphi therefore aims to come up with a core set of LMI that can be used to inform labour market policy by skills planners, researchers, government departments, employers and other participants in labour market policy.

3.3.2. Formulate questions

The questionnaire/set of questions must be designed to address the objectives of the Delphi process. It must include questions that will elicit responses from respondents, making it easy for them to grasp the issue and motivating them to address the questions promptly. All panel members will receive the same standard questionnaire/set of questions. The kind of question and number of questions depend on the aims of a particular Delphi exercise. Participants may be required to respond to a questionnaire involving a number of sub-questions or they may be challenged by a single question that nonetheless stimulates substantial responses.

The initial question of a Delphi study is generally open and broad, with subsequent questions moving towards an area of focus (Skulmoski et al. 2007: 10). This indicator Delphi will involve three questions that progress from a broad to a tighter focus:

- An open question that encourages input from the panel on the social, educational, labour market and economic problems that are currently of national importance and need to be addressed in the short, medium and long term.
- A question in two parts that (a) requires input from the panel on the major problems that may be addressed directly or indirectly through policies related to the demand and supply of skills and skills planning, followed by (b) a request for input from the panel on what indicators are needed to monitor and track the impact of policies and skills-planning decisions.

- A question that requires input from the panel on the combination of ranked indicators that will provide the best coverage to monitor the impact of policy and planning allocation decisions.

EXAMPLES OF QUESTIONS ENVISAGED FOR ROUND 1

Question 1

What are the challenges that South Africa faces in relation to generating work opportunities, improving the performance of the labour market and planning for better matching of demand and supply of graduates?

Starting points for consideration:

- Take some time to think about employment and unemployment in the South African economy right now, and share your opinion about what some of the most urgent challenges facing the country right now are.
- Taking into account the country's development path, tell us what you think will be the main challenges over the next 20 years in relation to employment, unemployment and skills development.

Question 2

What interventions or actions do you think should be undertaken or put in place to address the problems you have identified?

Starting points for consideration:

- For each of the challenges you have chosen, indicate interventions, strategies or policies that might be put in place to reduce the severity of the challenges or to resolve the underlying causes.
- What information would be necessary to address these challenges?

3.3.3. Choose facilitator and specify responsibilities

An important step in conducting the Delphi method is for the research team to select a facilitator, who will be responsible for coordinating, moderating and

capturing responses of the panel of experts throughout the process.

The facilitator's responsibilities are to:

- Coordinate the selection and invitation of appropriately qualified experts to participate in the Delphi process;
- Provide the panel with all the information needed for the process;
- Plan, design and structure rounds of questions;
- Oversee a specified number of rounds of questions, followed by feedback from the Delphi participants;
- Maintain focus on the key Delphi questions and objectives throughout the process;
- Encourage and initiate further discussions between participants where necessary
- Collate the responses from the panel, moderate and document the essence of the inputs from Delphi participants; and
- Write a report on the Delphi process.

3.3.4. Select participants

One of the most important aspects in the Delphi procedure is to identify and select a suitable group of qualified experts. This activity lies at the core of the Delphi method, thus it needs to be executed with care. The research team responsible for the selection would need to take into account a number of factors when selecting participants. The expertise, knowledge and capacity to participate and communicate one's ideas clearly are key requirements in a Delphi panellist. The structure of the participating group in terms of who is invited to participate and its overall size has to be considered carefully, as these decisions may influence the level and quality of interaction.

For the Indicator Delphi project, we employ the approach of Delbecq and colleagues (1975) to the selection of experts, with some amendments. The participant group may accommodate various stakeholders in the field – from senior officials in the DHET to teachers. The intention is to include a diverse group of participants that reflects groups or stakeholders with interests in indicator selection. The following criteria will be used to select panel participants:

- Relevance of background, experience and qualifications;
- Knowledge of study area;
- Availability in the period envisaged for the Delphi process; and
- Accessibility via e-mail.

The Indicator Delphi study will invite participants from sectors relevant to or with specific interests in the development of indicators for skills planning and labour market planning as it relates to the employed, unemployed, formal and informal sectors.

Each sector will be categorised according to skills and disciplines. The initial categories of experts are academics, practitioners or professionals, government officials, non-governmental organisation (NGO) officials and civil society (Table 1).

Table 1: Selection of panel members

Sector	Institutions
Government officials	Representatives of the DHET, Department of Performance Monitoring and Evaluation, Department of Trade and Industry
Skills planning practitioners	Research officers and skills planners in SETAs
Representatives of business sector	Industry associations, professional bodies
Academics and researchers in higher education and research institutions	Researchers and academics in universities and research institutions, working in fields such as economics, sociology, geography, public administration and policy studies
NGO and civil society representatives	South African Graduates Development Association, South African Youth Council

The procedure for the selection of sectors goes through a number of steps. The process to be followed – with some amendments – is outlined by Delbecq et al. (1975) as:

- Prepare: Identify relevant disciplines or skills or experience, organisations and relevant publications from the literature.
- Populate: Tabulate the names of individuals from relevant disciplines, organisations and academic and practitioner authors.
- Nominate: Contact those nominated in Step 2 and request them to nominate other experts.
- Invite: Experts for each panel with a target size of five to eight.

For each group of participants the aim will be to recruit a group large enough for four to undertake the Delphi.

3.4 Questions, responses and moderation

The process designed for this Indicator Delphi project will involve a series of conceptually linked interactions over three rounds. The direction of the questions and the moderation will be informed by two approaches to eliciting input from the panellists. First, akin to brain-storming, participants will be asked to respond to a broad question about the policy challenges for South Africa's post-school education system in the context of unemployment and of pressure to achieve labour-absorbing growth. Panellists will be requested to nominate indicators

best suited to track changes in features relevant to skills planning. The next phase will involve valuing indicators by inviting the panellists to select and rank them. Panellists will be challenged to choose a limited but coherent set of useful indicators. As indicated earlier, the moderator will support the process by reviewing the pattern of panellists' responses from each round and capturing and sharing other inputs and comments from panellists.

3.5 Data analysis

The Delphi process will employ a mix of mainly qualitative analysis involving discursive analysis of the texts produced by panellists together with descriptive analysis of indicator selection patterns by the panel.

4. REFERENCES

- Albright RE (2002) What can past technological forecast tell us about the future? *Technological Forecasting and Social Change*, 69(5): 455
- Coates J (1999) Boom time in forecasting. *Technological Forecasting and Social Change*, 62: 37–40
- Coates V, Faroque M, Klavans R, Lapid K, Linstone H, Pistorius C & Porter A (2001) On the future of technological forecasting. *Technological Forecasting and Social Change*, 67: 1–17
- Cook C, Brismée JM, Fleming R & Sizer PS Jr (2005) Identifiers Suggestive of Clinical Cervical Spine Instability: A Delphi Study of Physical Therapists. *Journal of American Physical Therapy*, 85(9): 895–906
- Critcher C & Gladstone B (1998) Utilizing the Delphi technique in policy discussion: a case study of a privatized utility in Britain. *Public Administration*, 76: 431–449
- De Villiers MR, de Villiers PJ & Kent AP (2005) The Delphi technique in health sciences education research. *Medical Teacher*, 27(7): 639–643
- Delbecq A, Van de Ven A & Gustafson DH (1975) *Group Techniques for Program Planning: A Guide to Nominal Group and Delphi Processes*. Glenview, USA: Scott, Foresman and Company
- DHET (Department of Higher Education and Training) (2009) *Human Resources Development Strategy for South Africa (HRD-SA) 2010–2030*
- Epicum M (2011) *Delphi Method of Predicting the Future for Mankind*. Available at acefinance.me/2013/07/15/delphi-method-of-predicting-the-future-for-mankind/ [accessed on 7 June 2013]
- Hilbert M, Miles I & Othmer J (2009) Foresight tools for participative policy-making in inter-governmental processes in developing countries: Lessons learned from the eLAC Policy Priorities Delphi. *Technological Forecasting and Social Change*, 76(7): 880–896
- Ilbery B, Maye D, Kneafsey M, Jenkins T & Walkley C (2004) Forecasting food supply chain development in lagging rural regions: Evidence from the UK. *Journal of Rural Studies*, 20: 331–344
- Kaynak E, Bloom J & Leibold M (1994) Using the Delphi technique to predict future tourism potential. *Marketing Intelligence & Planning*, 12(7): 18–29
- Linstone H & Turoff M (1975) The policy Delphi. In H Linstone & M Turoff (eds) *The Delphi Method: Techniques and Applications*. Don Mills, ON: Addison-Wesley
- Linstone H & Turoff M (2002) *The Delphi Method: Techniques and Applications*. London: Addison-Wesley

- Martino J (1999) Thirty years of change and stability. *Technological Forecasting and Social Change*, 62: 13–18
- McCluskey S (2006) The need for national leadership, partnerships and programmes to promote the health and well-being of looked after children in Scotland. *Scottish Journal of Residential Child Care*, 5(2): 12–19
- Miller G (1993) The development of indicators for sustainable tourism: results from a Delphi survey of tourism researchers. London: University of Westminster. Available at epubs.surrey.ac.uk/634820/3/Miller_the%20development.pdf [accessed on 12 December 2013]
- Needham RD (1990) Geographic: The Policy Delphi: purpose, structure and application. *The Canadian Geographer*, 34(2): 133–142
- Okoli C & Pawlowski SD (2004) The Delphi method as a research tool: An example, design considerations and applications. *The Journal of Information & Management*, 42: 15–29
- Skulmoski GJ, Hartman FT & Krahn J (2007) The Delphi method for graduate research. *Journal of Information Technology Education*, 6(4): 1–21
- Stewart M (2010) Quality of congestive heart failure care: Assessing measurement of care using electronic medical records. *Canadian Family Physician*, 56: 432–437