Introduction

- Born in Turkey – Undergraduate (Bogazici University) and MBA (Marmara University) in Marketing
- Professional Work Experience
  - 4-5 years in Tourism and Textile industries
- Ph.D. in IB/Marketing - University of South Carolina – 2000-2004
- Academic Experience
  - MSU since 2006 – Marketing Department
  - Ph.D. Program Director in Marketing
  - IBC-CIBER Director
- Teaching: International Business/Marketing and Marketing Strategy
- Research: Firm Strategic Orientations in a Global Context, Firm Internationalization, Innovation

Agenda

- What is a Meta-Analysis?
- Why Meta-Analysis in International Business?
- Stages in the Meta-Analytic Research Process
- Recommendations
What is a “Meta-Analysis”?

- Meta-analysis is a systematic and quantitative review technique that help a field to take stock of knowledge by:
  1. combining findings across studies,
  2. comparing study findings,
  3. generating and testing theoretical propositions.

The Logic of Meta-Analysis

- **Systematic** vs. Narrative Reviews
  - Narrative reviews – Broad in scope; selection criteria are usually not specified; potentially biased; often qualitative reviews
  - Systematic reviews assemble, critical appraise, and synthesize all relevant studies that address a specific question.
  - Meta-analysis focuses on the direction and magnitude of the effects across studies using quantitative measures (i.e., effect size).

Why Meta-Analysis in International Business?

- Excellent tools for researchers in business because a meta-analysis can:
  - Provide empirical generalizations about phenomena across different research contexts (i.e., mean effects),
  - Examine the effects of substantive and methodological study characteristics (i.e., moderators),
  - Test theory using more comprehensive models of factors than those employed in primary studies (i.e., theory testing using meta-analysis).
- Useful in teaching
- Relevant for practitioners

Number of Meta-Analyses by Year

Source: Kirca and Yaprak 2010 IBR
Stages in the Meta-Analytic Research Process

- Problem formulation
- Literature search and data collection
- Data coding and evaluation
- Data analysis
- Interpretation and discussion of results

Stage 1 - Problem Formulation
(When Can You Do a Meta-Analysis?)

- Meta-analysis is applicable when in a given research domain studies...
  - Produce quantitative results, rather than qualitative findings
  - Examine the same/similar constructs and relationships
  - Have findings that can be configured in a comparable statistical form (e.g., as effect sizes, correlation coefficients, odds-ratios, proportions)
  - Provide disparate findings

Example: Multinationality-Performance (M-P) Meta-Analysis
(Kirca et al. 2011 – AMJ)

- The extent to which a firm expands its value-adding activities beyond national borders into new country markets and geographic regions (Hennart 2007; Hitt, Tihanyi, Miller, and Connelly 2006).
- A well-established research stream: linear (Delios and Beamish 1999) ... non-linear (Contractor, Kundu, and Hsu 2003; Lu and Beamish 2004) effects of multinationality on performance in manufacturing (Tallman and Li 1996) ... and services industries (Capar and Kotabe 2003), ... for U.S. (Thomas and Eden 2004) and ... non-U.S. companies (Ruigrok, Amann, and Wagner 2007), ... as well as for small (Autoio, Sapienza, and Almeida 2000) ... and large firms (Kim, Hoskisson, and Wan 2004).

Inconclusive Findings

Research findings are often characterized as:
- ‘mixed’ (Hitt, Hoskisson, and Kim 1997; Thomas and Eden 2004),
- ‘inconclusive’ (Tallman and Li 1996),
- ‘inconsistent’ (Ruigrok and Wagner 2003),
- ‘contradictory’ (Contractor 2007; Ruigrok and Wagner 2003),
- ‘conflicting’ (Annavarjula and Beldona 2000), and
- ‘disappointing’ (Hennart 2007).
Recommendation for Problem Formulation Stage:
Read, read, and read more...

Stage 2 – Literature Search and Data Collection
1. ABI/INFORM and Science Direct databases were searched for: “multinationality”, “degree of internationalization”, “international diversification”, and “internationalization”.
2. An issue-by-issue search was conducted for 14 major management and international business journals.
3. Examined references of all major reviews of research previously published on the topic (e.g., Annavarjula and Beldona 2000; Bausch and Krist 2007; Hitt, et al. 2006; Li 2007; Osegowitsch and Zalan 2005).
4. Searched the websites of WTO, NSF, UNCTAD, IMF, and NBER for working papers.
5. Requests were posted on AIB and AOM list-servers to elicit unpublished research in an effort to address the "file-drawer" problem (Rosenthal 1995).

Recommendation for Literature Search and Data Collection Stage:
Search, search, and search (far and wide)...

Stage 3 - Data Evaluation and Coding
1. A coding protocol specifying the information to be extracted from each study was prepared to reduce coding error (Lipsey and Wilson 2001; Stock 1994). An initial draft was revised based upon feedback from four IB scholars.
2. A coding form was prepared for coders who recorded the extracted data on the variables of interest, including outcome statistics (i.e., effect size estimates), study sample sizes, statistical artifacts (i.e., measure reliability statistics)...
3. Each study was coded by two independent coders knowledgeable about the M-P literature. The inter-coder reliability estimate ranged between 0.92 and 0.97 (cf. Perreault and Leigh 1989, p. 147).
4. Remaining discrepancies were resolved through discussion before reaching consensus.
Recommendation for Data Evaluation Stage:  
Code, code, read, and re-code…

Stage 4 - Data Analysis
- Effects obtained from each study were corrected for measurement error by dividing the correlation coefficient by the product of the square root of the reliabilities of the two constructs, when available (Hunter and Schmidt 1990).
- The reliability-corrected correlations were transformed into Fisher’s z-coefficients. Subsequently, the z-coefficients were averaged and weighted by an estimate of the inverse of their variance (N – 3) to give greater weight to more precise estimates and reconverted to correlation coefficients (Hedges and Olkin 1985).
- Homogeneity of effects was tested by calculating Q-statistic value (Hedges and Olkin, 1985).
- Fixed Effects Analog to the one-way ANOVA (i.e., bivariate analyses)
- SEM using meta-analytical correlation matrix for theory testing

Recommendation for Data Analysis:  
Analyze, analyze, re-code, read, and re-analyze…

Stage 5 – Summarizing and Interpreting the results
- Summary tables for main effects, moderator results (bivariate and multivariate), and structural models (if necessary)
- Strength of evidence issue
- Developing field – inconsistencies across reviewers with regards to “best practices”
- Practical and theoretical implications
- Implications for future research
- Make sure you include the limitations
Main Effects for the Multinationality-Performance Relationship

<table>
<thead>
<tr>
<th>Relationships</th>
<th>Number of Effects</th>
<th>Total Sample Size</th>
<th>Corrected Mean r</th>
<th>Standard Error</th>
<th>95% Confidence Interval</th>
<th>Availability Bias</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asset specificity – Multinationality</td>
<td>84</td>
<td>42,628</td>
<td>.14*</td>
<td>.005</td>
<td>.13 to .15</td>
<td>1123</td>
</tr>
<tr>
<td>R&amp;D intensity – Multinationality</td>
<td>57</td>
<td>27,991</td>
<td>.17*</td>
<td>.006</td>
<td>.16 to .19</td>
<td>784</td>
</tr>
<tr>
<td>Advertising intensity – Multinationality</td>
<td>27</td>
<td>14,637</td>
<td>.07*</td>
<td>.008</td>
<td>.05 to .08</td>
<td>85</td>
</tr>
<tr>
<td>Multinationality – Financial performance</td>
<td>146</td>
<td>104,074</td>
<td>.10*</td>
<td>.003</td>
<td>.09 to .11</td>
<td>5,308</td>
</tr>
<tr>
<td>ROA</td>
<td>83</td>
<td>27,610</td>
<td>.07*</td>
<td>.006</td>
<td>.06 to .08</td>
<td>416</td>
</tr>
<tr>
<td>Sales</td>
<td>74</td>
<td>17,251</td>
<td>.19*</td>
<td>.008</td>
<td>.18 to .21</td>
<td>874</td>
</tr>
<tr>
<td>ROS</td>
<td>51</td>
<td>16,807</td>
<td>.07*</td>
<td>.008</td>
<td>.05 to .08</td>
<td>179</td>
</tr>
<tr>
<td>Overall profitability</td>
<td>37</td>
<td>10,944</td>
<td>.09*</td>
<td>.010</td>
<td>.07 to .11</td>
<td>144</td>
</tr>
<tr>
<td>Sales growth</td>
<td>35</td>
<td>7,780</td>
<td>.11*</td>
<td>.011</td>
<td>.09 to .13</td>
<td>138</td>
</tr>
<tr>
<td>ROE</td>
<td>28</td>
<td>8,640</td>
<td>.12*</td>
<td>.011</td>
<td>.09 to .14</td>
<td>125</td>
</tr>
<tr>
<td>Tobin’s Q</td>
<td>12</td>
<td>7,812</td>
<td>.11*</td>
<td>.011</td>
<td>.08 to .13</td>
<td>45</td>
</tr>
<tr>
<td>ROI</td>
<td>10</td>
<td>2,752</td>
<td>.04*</td>
<td>.019</td>
<td>.01 to .08</td>
<td>2</td>
</tr>
</tbody>
</table>

Moderator Analyses (Bivariate)

<table>
<thead>
<tr>
<th>Levels</th>
<th>Total Number of Effects</th>
<th>95% Confidence Intervals</th>
<th>Corrected Mean r</th>
<th>Summary of Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. High R&amp;D intensity</td>
<td>84</td>
<td>.10 to .12</td>
<td>.11*</td>
<td>a &gt; b*</td>
</tr>
<tr>
<td>b. Low R&amp;D intensity</td>
<td>65</td>
<td>.05 to .08</td>
<td>.07*</td>
<td></td>
</tr>
<tr>
<td>a. High advertising intensity</td>
<td>33</td>
<td>.04 to .06</td>
<td>.05*</td>
<td>b &gt; a*</td>
</tr>
<tr>
<td>b. Low advertising intensity</td>
<td>51</td>
<td>.08 to .11</td>
<td>.09*</td>
<td></td>
</tr>
</tbody>
</table>

Recommendation for Interpretation and Discussion of Results:
Write, read, and write...

Limitations of Meta-Analysis

- Limitations of the original empirical studies
- You can’t compare apples and oranges.
- Garbage in, garbage out in combining results from high-quality and low-quality studies.
- Selectivity Bias and file drawer problem.
- Theoretical contribution of meta-analyses.
- The correlational nature of review evidence.
- The post hoc nature of synthesis tests.
- Misspecification problem persists if all studies contain the same misspecification bias.
### Software for Meta-Analysis
- Comprehensive Meta-Analysis – [https://www.meta-analysis.com](https://www.meta-analysis.com) – Easy to use meta-analysis software but need to pay! for students, lite version
- Review Manager (RevMan 5) from the Cochrane Collaboration – free meta-analysis software
- R – Free but difficult – Need to write syntax
- Stata – Not free, medium difficulty – Need to write syntax
- SAS – Not free difficult – Need to write syntax
- SPSS – Not free, medium difficulty – No syntax

### Useful Websites
- Professor Wilson from GMU [http://mason.gmu.edu/~dwilsonb/ma.html](http://mason.gmu.edu/~dwilsonb/ma.html)
- Evidence-Based Medicine - [www.cochrane.org](http://www.cochrane.org)
- [www.campbellcollaboration.org](http://www.campbellcollaboration.org)
- Center for Evidence-Based Management [https://www.cebma.org](https://www.cebma.org)
- Comprehensive Meta-Analysis – Bornstein [https://www.meta-analysis.com](https://www.meta-analysis.com)

### Recommended Books
- *How Science Takes Stock* 
The Story of Meta-Analysis – Morton Hunt

### Additional Readings
- Meta-Analysis for Public Management and Policy – Evan Ringquist
- How Science Takes Stock 
The Story of Meta-Analysis – Morton Hunt