

# Contents

|          |   |    |
|----------|---|----|
| <b>1</b> | <b>Research on the Capability of Technological Innovation Based on the Maintenance Time of Patent</b> . . . . .           | 1  |
|          | Yongzhong Qiao  |    |
| 1.1      | Introduction . . . . .  | 1  |
| 1.2      | Data Collection and Design of Variables . . . . .   | 3  |
|          | 1.2.1 Data Collection. . . . .  | 3  |
|          | 1.2.2 Variables Design. . . . .   | 3  |
| 1.3      | Analysis of the Basic Status of Patent Maintenance Times . . . . .  | 4  |
|          | 1.3.1 Basic Status of Patents . . . . .   | 4  |
|          | 1.3.2 Analysis of the Maintenance Status of Patents . . . . .   | 6  |
|          | 1.3.3 Comparison of Maintenance Status of Patents Owned by Different Types of Owners . . . . .                            | 8  |
| 1.4      | Conclusions and Expectation . . . . .   | 10 |
| <b>2</b> | <b>The Analysis to Influencing Factors on the Technological Innovation Based on the Patent Maintenance Time</b> . . . . . | 11 |
|          | Yongzhong Qiao  |    |
| 2.1      | Introduction . . . . .  | 11 |
| 2.2      | Data Collection and Design of Variables . . . . .   | 13 |
| 2.3      | Basic Status of Patents . . . . .   | 13 |
|          | 2.3.1 Data Collection. . . . .  | 13 |
|          | 2.3.2 Analysis of the General Maintenance Status of Patents . . . . .   | 14 |
| 2.4      | Multiple Linear Regression Analysis of the Factors to Influent the Maintenance Time of Patents . . . . .                  | 15 |
|          | 2.4.1 Regression Results . . . . .  | 15 |
|          | 2.4.2 Progression Analysis . . . . .  | 16 |
| 2.5      | Conclusions and Inspiration . . . . .   | 17 |

|          |  |    |
|----------|--|----|
| <b>3</b> | <b>Comparative Study of the Innovation Ability Based on the Maintenance Status of Domestic Patents and Foreign Patents.</b> . . . . .                                | 19 |
|          | Yongzhong Qiao   |    |
| 3.1      | Introduction . . . . .   | 19 |
| 3.2      | Data Collection and Design of Variables . . . . .  | 21 |
| 3.3      | Comparisons of the Basic Status . . . . .  | 21 |
| 3.3.1    | Comparisons of the Legal Status of Domestic Patents and Foreign Patents . . . . .  | 21 |
| 3.3.2    | Comparisons of the Status of Fixed-Variable of Domestic Patents and Foreign Patents . . . . .  | 21 |
| 3.3.3    | Comparisons of the Maintenance Time of Domestic Patents and Foreign Patents . . . . .  | 22 |
| 3.4      | Comparisons of the Information of the Patent Applications . . . . .  | 23 |
| 3.4.1    | Comparisons of the Number of Claims of Domestic Patents and Foreign Patents . . . . .  | 23 |
| 3.4.2    | Comparisons of the Inventors Number of Domestic Patents and Foreign Patents . . . . .  | 24 |
| 3.4.3    | Comparisons of the Terminated Rate of Domestic Patents and Foreign Patents in Different Technical Fields . . . . .   | 25 |
| 3.5      | Conclusion . . . . .   | 26 |
| <b>4</b> | <b>Empirical Research on the Maintenance Time of Granted Patents in the Performing Operations and Transporting Technological Field in Six Countries.</b> . . . . .   | 27 |
|          | Yongzhong Qiao and Yan Zhang   |    |
| 4.1      | Introduction . . . . .   | 28 |
| 4.2      | Data Sources and Collection . . . . .  | 30 |
| 4.3      | Analysis of the Maintenance Time of Granted Patents in the Performing Operations and Transporting Technological Field in Six Countries. . . . .                      | 30 |
| 4.3.1    | Comparative Analysis of the Average Maintenance Time of Patents Granted in the Performing Operations and Transporting Technological Field in Six Countries . . . . . | 31 |
| 4.3.2    | Comparative Analysis of the Legal Status of Granted Patents in the Performing Operations and Transporting Technological Field in Six Countries . . . . .             | 33 |
| 4.3.3    | The Distribution of Granted Patents in the Performing Operations and Transporting Technological Field in Six Countries in Different Maintenance Periods . . . . .    | 35 |
| 4.4      | Conclusions . . . . .  | 37 |

|          |  |    |
|----------|--|----|
| <b>5</b> | <b>Comparative Study of the Renewal Information of Granted Patents in the Physics Technological Field in China, France and Germany</b> .....                             | 39 |
|          | Yongzhong Qiao and Wanlin Tan  |    |
| 5.1      | Introduction .....   | 40 |
| 5.2      | Data Collection and the Establishment of Database .....  | 41 |
| 5.3      | Information Analysis of Granted Patents in Physics Technological Field in China, France and Germany .....  | 42 |
| 5.3.1    | Analysis of the Claim Number of Granted Patents in Physics Technological Field in China, France and Germany .....  | 42 |
| 5.3.2    | Analysis of the Examination Time of Granted Patents in Physics Technological Field in China, France and Germany .....  | 43 |
| 5.3.3    | Analysis of the Average Inventor Number of Granted Patents in the Physics Technological Field in China, France and Germany .....   | 44 |
| 5.3.4    | Comparative Analysis of the Interval Scale of Granted Patents in the Physics Technological Field in China, France and Germany .....                                      | 45 |
| 5.3.5    | Comparative Analysis of the Abandoned Patents Number in the Physics Technological Field Granted by China, France and Germany .....                                       | 46 |
| 5.4      | Conclusions .....  | 48 |
| <b>6</b> | <b>The Cross-National Comparative Study of the Maintenance Time of Granted Patents in the Technical Field of Fixed Constructions in Different Countries</b> .....        | 49 |
|          | Jun Shen and Yongzhong Qiao  |    |
| 6.1      | Introduction .....   | 50 |
| 6.2      | Data Collection and Variable Design .....  | 51 |
| 6.2.1    | Data Collection .....  | 51 |
| 6.2.2    | Variable Design .....  | 51 |
| 6.3      | Comparative Analysis of the Maintenance Time of Granted Patents in the Technical Field of Fixed Constructions in the Four Countries .....                                | 51 |
| 6.3.1    | Comparative Analysis of the Mean Value of Maintenance Time of Granted Patents in the Technical Field of Fixed Constructions in the Four Countries .....                  | 52 |
| 6.3.2    | Comparative Analysis of the Distribution Trend of Different Maintenance Periods of Granted Patents in the Technical Field of Fixed Constructions in Four Countries ..... | 53 |

|          |  |           |
|----------|--|-----------|
| 6.4      | The Causal Analysis of the Difference of Maintenance Time of Granted Patents in the Technical Field of Fixed Constructions in Four Countries.....                  | 55        |
| 6.5      | Conclusion .....   | 56        |
| <b>7</b> | <b>Empirical Research of the Maintenance Time of Foreign Patents Without the Foreign Priority Granted by USA, Korea, Japan and China .....</b>                     | <b>57</b> |
|          | Yongzhong Qiao and Yan Sun   |           |
| 7.1      | Introduction .....   | 58        |
| 7.2      | Data Sources.....  | 60        |
| 7.3      | Data Analysis .....  | 60        |
| 7.3.1    | The Distribution of Foreign Patents Without the Foreign Priority .....   | 60        |
| 7.3.2    | Comparative Analysis of the Maintenance Time of Foreign Patents Without the Foreign Priority .....   | 63        |
| 7.4      | Conclusion .....   | 65        |
| <b>8</b> | <b>Research on the Relationship Between Maintenance Time and Examination Time of Patents .....</b>   | <b>67</b> |
|          | Yongzhong Qiao and Hao Peng  |           |
| 8.1      | Introduction .....   | 67        |
| 8.2      | Data Sources.....  | 69        |
| 8.3      | The Relationship Between the Examination Time and the Maintenance Time of Patents.....   | 69        |
| 8.3.1    | Based on the Perspective of the Percentage Variation of the Patent Number .....  | 70        |
| 8.3.2    | The Relationship Analysis Between the Maintenance Time and the Examination Time of Patents Based on the Perspective of the Variation of the Patent Number .....    | 71        |
| 8.3.3    | The Relationship Analysis Between the Maintenance Time and the Examination Time of Patents Based on the Perspective of the Examination Time within 2–5 Years ..... | 72        |
| 8.4      | The Analysis on the Reasons of the Relationship Between the Examination Time and the Maintenance Time of Patents.....  | 73        |
| 8.4.1    | The Perspective of the Patent Protection Term.....   | 74        |
| 8.4.2    | The Support Perspective of the Patent Policy .....   | 74        |
| 8.4.3    | The Perspective of the Patent Market.....  | 75        |
| 8.4.4    | The Perspective of the Examination System .....  | 76        |
| 8.5      | Conclusion and Enlightenment .....   | 76        |

|           |   |     |
|-----------|---|-----|
| <b>9</b>  | <b>Research on the Patent Licensing of the New Generation<br/>Information Technology Industry in China</b> .....  | 79  |
|           | Yongzhong Qiao and Siwen Liu  |     |
| 9.1       | Introduction .....  | 80  |
| 9.2       | Data Sources and Research Methods .....   | 80  |
| 9.3       | Data Analysis .....   | 81  |
| 9.3.1     | The Developing Trends of Patent Licensing<br>in Four Representative Enterprises .....   | 81  |
| 9.3.2     | The Distributions of the Patent Types to Licensing<br>in Four Representative Enterprises .....  | 82  |
| 9.3.3     | The Licensor or Licensee Distribution of Patent<br>Licensing in Four Representative Enterprises .....   | 82  |
| 9.4       | Conclusions .....   | 84  |
| <b>10</b> | <b>Research on the Technical Fields Distribution of Patents<br/>Licensing of Chinese Firms in the Next-Generation<br/>Information Technology Industry</b> ..... | 85  |
|           | Yongzhong Qiao and Siwen Liu  |     |
| 10.1      | Introduction .....  | 86  |
| 10.2      | Data Sources and Research Methods .....   | 87  |
| 10.3      | Data Analysis .....   | 87  |
| 10.3.1    | The Distribution of the Sections of Technical Fields<br>of Patents Licensing .....  | 87  |
| 10.3.2    | The Distribution of the Classes of Technical Fields<br>of Patents Licensing .....   | 88  |
| 10.3.3    | The Distribution of the Subclasses of Technical<br>Fields of Patents Licensing .....  | 89  |
| 10.4      | Conclusion .....  | 90  |
| <b>11</b> | <b>Research on the Granted Patent Distribution<br/>of the Energy-Saving and Environmental Protection<br/>Industry in China</b> .....                            | 91  |
|           | Yongzhong Qiao and Qi Liang   |     |
| 11.1      | Introduction .....  | 92  |
| 11.2      | Data Source and Industry Classification .....   | 93  |
| 11.3      | The Granted Patents Distribution of the Energy-Saving<br>and Environmental Protection Industry .....  | 94  |
| 11.3.1    | The Overall Features of the Granted Patents .....   | 94  |
| 11.3.2    | The Granted Patents Distributions<br>of the Energy-Saving Industry .....  | 95  |
| 11.3.3    | The Granted Patents Distributions<br>of the Resources Recycling Industry .....  | 97  |
| 11.4      | The Granted Patents Distributions of the Environmental<br>Management Industry .....   | 99  |
| 11.4.1    | The Granted Patents Distribution of Main Fields<br>of the Environmental Management Industry .....   | 100 |

|           |  |            |
|-----------|--|------------|
| 11.4.2    | The Domestic and Foreign Granted Patents Distributions of the Environmental Management Industry.....   | 101        |
| 11.5      | Conclusions .....  | 101        |
| <b>12</b> | <b>Research on the Distribution of Patented Technologies of Energy-Saving Industry in China .....</b>  | <b>103</b> |
|           | Yongzhong Qiao and Qi Liang  |            |
| 12.1      | Introduction .....   | 104        |
| 12.2      | Data Source and Technology Classification.....   | 105        |
| 12.3      | The Patent Distributions of Main Technologies in the Energy-Saving Industry .....  | 105        |
| 12.3.1    | Technological Innovation Characteristics of the Energy-Saving Industry in China.....   | 105        |
| 12.3.2    | Distributions of Granted Patents in the Technological Fields of Industrial Boiler Design and Manufacturing and Waste Heat and Energy Utilization ..... | 106        |
| 12.3.3    | Distributions of Granted Patents in the Technological Fields of Environmentally Air Conditioning and Heat Pump.....                                    | 107        |
| 12.4      | Conclusions .....  | 109        |
| <b>13</b> | <b>Research on the Granted Patent Distributions of Significance Firms in the New Energy Automobile Industry in China .....</b>                         | <b>111</b> |
|           | Yongzhong Qiao and Tiantian Zhang  |            |
| 13.1      | Introduction .....   | 112        |
| 13.2      | Technical Field and Data Retrieval .....   | 113        |
| 13.2.1    | Technical Fields .....   | 113        |
| 13.2.2    | Key Enterprises .....  | 114        |
| 13.2.3    | Data Retrieval.....  | 114        |
| 13.3      | Data Analysis .....  | 114        |
| 13.3.1    | The Overall Distributions of Granted Patents of Four Technological Fields .....  | 114        |
| 13.3.2    | Distributions of Granted Patents in the Hybrid Electric Vehicle Field .....  | 115        |
| 13.3.3    | Distributions of Granted Patents in the Blade Electric Vehicle Field .....   | 116        |
| 13.3.4    | Distributions of Granted Patents in the Fuel Cell Electric Vehicle Field .....   | 117        |
| 13.3.5    | Distributions of Granted Patents in the Battery Technical Field.....   | 118        |
| 13.4      | Conclusion .....   | 119        |
| <b>14</b> | <b>The Patent Protection of the Traditional Chinese Medicine and the Impact on the Industry R&amp;D in China .....</b>                                 | <b>121</b> |
|           | Yongzhong Qiao and Xuezhong Zhu  |            |
| 14.1      | Introduction .....   | 121        |

|           |  |            |
|-----------|--|------------|
| 14.2      | The Status Quo of Patent Protection of TCM .....   | 122        |
| 14.2.1    | An Overview of TCM Patent Applications .....   | 122        |
| 14.2.2    | An Overview of TCM Patent Grants .....   | 123        |
| 14.2.3    | TCM International Patent Applications .....  | 124        |
| 14.3      | The Impact of Patent Protection on the TCM Industry R&D ...  | 125        |
| 14.3.1    | The Impact of Patent Protection of TCM<br>on the Expense and Social Benefits of TCM<br>Institutions' R&D ..... | 125        |
| 14.3.2    | The Impact of TCM Patent Protection on the TCM<br>Institution Human Resources .....                            | 126        |
| 14.3.3    | The Impact of TCM Patent Protection<br>on the Scientific/Technical Output of TCM<br>Institutions .....         | 127        |
| 14.4      | The Challenges Confronting TCM Patent Protection<br>and the Solutions .....                                    | 128        |
| <b>15</b> | <b>Study on the Ownership of Inventions-Creations<br/>by the Government-Funded in China .....</b>              | <b>131</b> |
|           | Yongzhong Qiao   |            |
| 15.1      | Introduction .....   | 132        |
| 15.2      | The Development and the Defects of the Relevant Policies. ....   | 133        |
| 15.2.1    | The Development of the Relevant Policies .....   | 134        |
| 15.2.2    | The Defects of the Relevant Policies .....   | 134        |
| 15.3      | The Analysis on the Ownership Mode<br>of Inventions-Creations by the Government Funds .....                    | 135        |
| 15.3.1    | The Analysis of Advantages and Disadvantages .....   | 135        |
| 15.3.2    | The Latest Policies and Their Flaws .....  | 136        |
| 15.3.3    | Legislative Proposals .....  | 137        |
| 15.4      | The Impact of the Modes of Ownership on the Amounts<br>of Inventions-Creations .....                           | 137        |
| 15.4.1    | Comparative Between the Amounts of the Service<br>Invention Patents and the Government Funds .....             | 137        |
| 15.4.2    | Comparative Between the Achievements of NKTRP<br>and the Government Funds .....                                | 138        |
| 15.4.3    | Comparative Between the Achievements<br>of NPKBRD and the Government Funds .....                               | 139        |
| 15.5      | Conclusions .....  | 141        |