

Research Policy via Funding Allocation Analysis

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Abstract

The National Council of Scientific Research in Higher Education, created in 1994 as a component of the Romanian educational reform, has the aim to ensure development and consolidation of the scientific research in higher education. Since 1995, an annual grant competition is opened and the research projects are received and analyzed. The eligible projects enter in evaluation process and according with the obtained score, a number of projects receive funds. The purpose of our research was to identify and analyse the research policy in higher education between 1995 and 2004. The allocation of the research funds according with institutions and their geographical clusterization, project type and research field were analyzed. All research projects financed by the National Council of Scientific Research in Higher Education between 1995 and 2004 were included into analysis (a total number of eleven thousand seven hundred and eighty five projects). The following variables were collected and stored for each project: the project type, the commission where the project was evaluated, the title of the project, the institution or university name, the number of points obtained after evaluation, and the value of the funding expressed as USD. The data were summarized and statistical analyzed. The averages of the funds according with the commission, year, university or institution, and domain were compared at a significance level of 5%. According with the obtained results the research funding policy between 1995 and 2004 was discussed.

Keywords: *Research Policy, Romania National Council of Scientific Research in Higher Education, Analysis*

Introduction

The *policy of research* is relates with the long term scheduling of research objectives. Policy of research is made at continental level (such as European Union - EU), national level, regional level, and institutional level.

The European Union research policy refers the development of a program for research, and creating of research policy, operational tools at continental level (ERA-AGE project, see Geyer, 2005), EDICT-European Demonstration of Innovative City Transport - see Tegner, 2005). According with these objectives, on April 6, 2006, the European Commission adopted a proposal for a new EU research program. The program for the first time scheduled the criteria of a European Research Council, with the objective of support for the best in European investigator-driven research (EURAB WG4, 2003).

At national level, the governmental agencies are responsible for implementing of national policy of research. Well known is NSF - National Science Foundation (Goth, 2005 and NSF, 2006) - the U.S. most important governmental agency for implementing the U.S. national policy of research.

According with national funding research policies different kind of funding models were used and analyzed: United Kingdom (Charterji and Seaman, 2007), Sub-Saharan Africa (Temu, 2006), Germany (Hornbostel, 2001), Finland (Ebersberger, 2005), Australia (Prem, 2005), Norway (Nelson, 2005), etc. At

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international level, some researches were conducted in order to compare the research activity and funding on different continents and research fields (Man, 2004 and Philipson, 2005).

In Romania, at least three institutions that act at national level can be listed: the National Authority for Scientific Research (ANCS - since August 2005 - see NASR, 2006), the National University Research Council (CNCSIS - since 1995 - see NURC, 2006), and the Romanian Academy (AR - since 1866, see RA, 2006).

The present study is based on published data by NURC (the main agency for research funding in higher education institutions) related to funding of research through projects during the 1995-2004 years (ten years).

Starting from the hypothesis, that knowledge can be learn from history of funding research, the present study was conducted in order to understand and exposed the research management policy at national level, from 1995 to 2004.

Methodology

Material

A series of data files published by NURC were downloaded and processed in order to be included in the research. The web repository of NURC contains links to previous years (at date of writing contains data from 1995 to 2004): <http://www.cnscis.ro/arhiva.php> and an uplink contains the rest of data (<http://www.cnscis.ro/granturi.php>).

A huge file containing all data were prepared and deposited onto a server in order to be queried (the text file had over 2 Mb) and included the following variables: year of funding, project type (A – scientific research projects, AT – scientific research projects for young doctors, BD – scientific research bursary for PhD students, E – projects for laboratory equipments, TD – research projects for young PhD students), commission code responsible for proposes evaluation (from 1 to 7, splitting the research fields into major areas), amount of funding (USD, at currency change rate of the given year), organization (usually, but not only, an university), project code, the name of the manager, and the title of the project.

The data presented in table 1 was used to convert national currency to USD (from Romanian National Bank archives).

Table 1. Averaged ROL to USD exchange rates during 1995-2004 years (rounded values)

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
ROL/USD	2033	3083	7168	8876	15333	21693	29061	33056	33200	32637

The conversion to USD was necessary, in order to perform an objective analysis related to funding amount, because there was a large variation of the exchange rate during this period (over 900%).

Analysis Method

Specific statistics methods were used in order to find relevant aspects of research management policy at national level. Two-steps cluster analysis technique had been applied in order to find similarities of research funds according with cities. This method has been chose because has specific feature: automatic selection of the best number of clusters, and ability to create cluster models simultaneously based on categorical and continuous variables. The data were analyzed and summarized using SPSS 12.0 software. Graphical representations were performed using Microsoft Excel software.

Findings

Descriptive statistics

- Total amount of funds invested by NURC into higher education institutions between 1995 and 2004 periods: 23,230,057 USD (about 23 mil. USD);
- Averaged by year amount of funds: about 2 mil. USD;
- The worst year: 2000 (about 1.27 mil. USD);
- The best year: 2004 (about 5.55 mil. USD);
- The bottom two number of funded projects by type: 8 (BD projects - research bursary for young PhD students; introduced since 2004), 61 (E - project for laboratory equipments, since 2002);
- The top two number of funded projects by type: 9926 (A – scientific research projects), 1318 (AT - scientific research projects for young doctors, since 2000);
- The top two number of funded projects by commission: 4580 (commission 2 - Engineering Sciences), 2359 (commission number 1 – Mathematic and Nature Sciences);

- The bottom two number of funded projects by commission: 29 (commission 7 - Arts and Architecture, introduced in 2004), and 257 (commission number 6 - Medical Sciences);
- The biggest amount of funds of a research project: 49181 USD (year: 1995, project type: A, Commission: 6 - Medical Sciences, Beneficiary institution: "Iuliu Hațieganu" University Medicine and Pharmacy Cluj-Napoca, project no. 24);
- The lowest amount of funds of a research project: 2 USD (year: 1999, project type: A, Commission: 1, Beneficiary institution: Bucharest University, project no. 238. Note that also are listed as funded a number of eleven projects with 0 USD (2 in 1995, 1 in 1998, 8 in 2004); the reason of listing remains unknown for us.

More descriptive statistics

- Top three cities by total funding: Bucharest (8.8 mil. USD), Cluj-Napoca (5.3 mil. USD), Iași (3.9 mil. USD); Bottom three cities by total funding: Bujorul (904 USD), Baneasa and Vidra (both with 888 USD).
- Top three cities by total funding reported to the number of funded projects: Alba-Iulia (3018 USD/project), Targu-Mures (2659 USD/project), Targoviste (2287 USD/project); Bottom three cities by same criteria: Lovrin (492 USD/project), Băneasa and Vidra (both with 444 USD/project).
- Top three cities by total funding reported to the number of funded institutions: Cluj-Napoca (313812 USD/institution), Iasi (278821 USD/institution), Brasov (275416 USD/institution); Bottom three cities by total funding reported to the number of funded institutions: Bujorul (904 USD), Băneasa and Vidra (both with 888 USD).
- Top three cities by number of funded projects reported to the number of funded institutions: Brasov (171 projects/institution), Cluj-Napoca (161 projects/institution), Iasi (146 projects/institution); Bottom three cities by number of funded projects reported to the number of funded institutions: Fundeni, Murfatlar and Bujorul (all with 1 project/institution).

Time series

By taking into consideration the results from "More Descriptive Statistics" section, it is interesting to observe the evolution of funding for tops cities. There were included into the analysis the following cities: Alba-Iulia (1), Brasov (2), Bucharest (3), Cluj-Napoca (4), Iasi (5), Targoviste (6), Targu-Mures (7). In the Figure 1 are presented the total amounts of funds by year for selected cities.

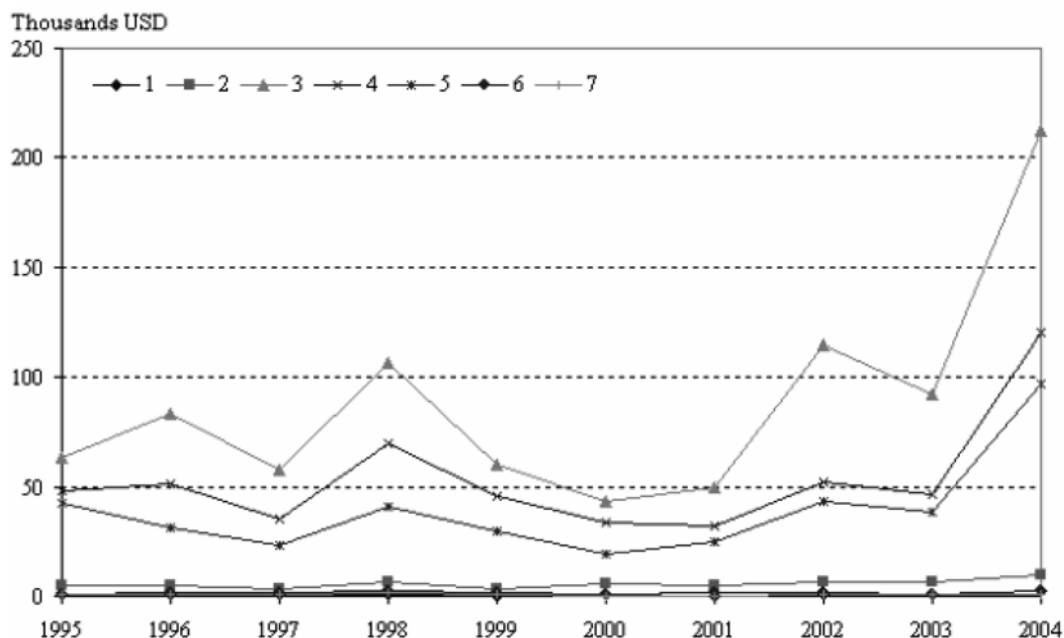


Figure 1. Amounts of funds (expressed in USD) from NURC during 1995-2004 for seven selected cities (1 = Alba-Iulia; 2 = Brasov; 3 = Bucharest; 4 = Cluj-Napoca; 5 = Iasi; 6 = Targoviste; 7 = Targu-Mures)

As can be seen from figure 1, are “visible” only three cities (3-Bucharest, 4-Cluj-Napoca, and 5-Iasi). Another indicator can show something. Because Bucharest is the Capital City, a relative indicator to Bucharest, can reveal interesting geographic distribution of funds. Figure 2 presented the relative to Bucharest funds distribution.

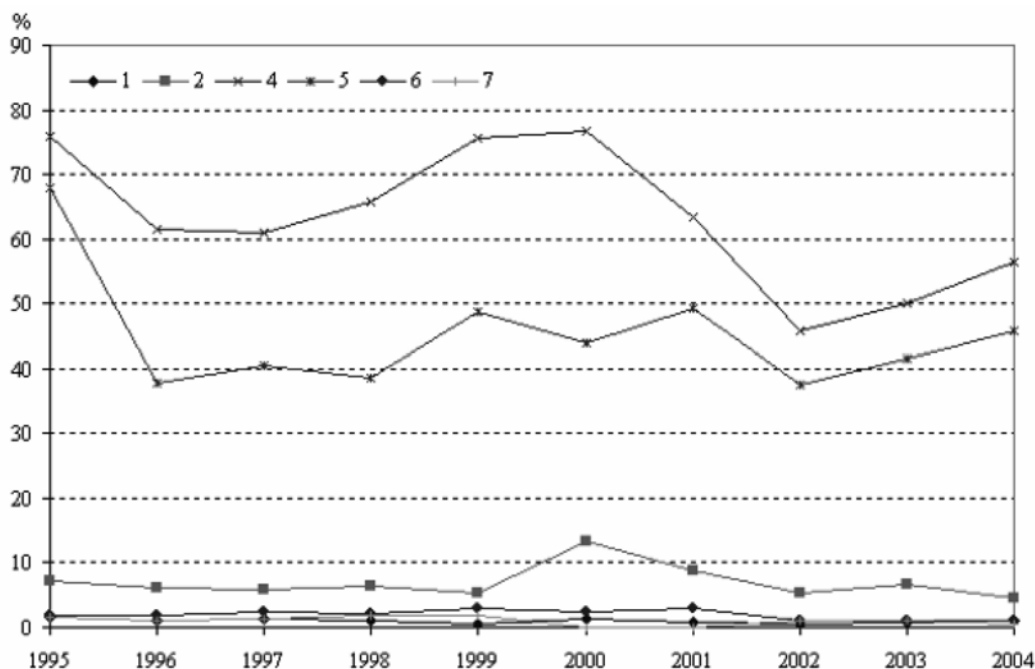


Figure 2. Relative to Bucharest funds distribution by cities for selected cities
(1 = Alba-Iulia; 2 = Brasov; 4 = Cluj-Napoca; 5 = Iasi; 6 = Targoviste; 7 = Targu-Mures)

There can be observed from Figure 2 how big the difference from the “group of three” of others is. Another observation that could not be observed directly from figure 2 is related to standard deviation of values. The biggest standard deviation was for Cluj-Napoca (the challenger, 11%). A group of three cities had standard deviations below 1% (Alba-Iulia, Targoviste and Targu-Mures).

It is interesting to see how these data are clustered. The table 2 contains correlations between data presented in figure 1.

Table 2. Correlations between funds by cities for selected cities

	1	2	3	4	5	6	7
1	1						
2	0.80	1					
3	0.86	0.88	1				
4	0.92	0.85	0.96	1			
5	0.90	0.83	0.96	0.96	1		
6	0.58	0.39	0.56	0.70	0.52	1	
7	0.41	0.30	0.49	0.53	0.44	0.58	1

1 = Alba-Iulia; 2 = Braşov; 3 = Bucharest; 4 = Cluj-Napoca;
5 = Iaşi; 6 = Târgovişte; 7 = Târgu-Mureş

There can be observed from Table 2 that a cluster formed from five cities (Alba-Iulia 1, Brasov 2, Bucharest 3, Cluj-Napoca 4, and Iasi 5).

Cluster analysis

The two-steps cluster analysis method has been applied on correlation coefficients between Bucharest funds and each other city and on the ratios of each city funds reported to Bucharest for each year included into the analysis. Two clusters were identified: first cluster that comprised four cities (Bucharest, Cluj-Napoca, Iasi and Timisoara) and second cluster that comprised twenty-nine cities (all other cities included

into analysis). The variation of the correlation coefficients according with the cluster is presented in Figure 3, and the clusterwise importance of the correlation coefficient into clustering in Figure 4.

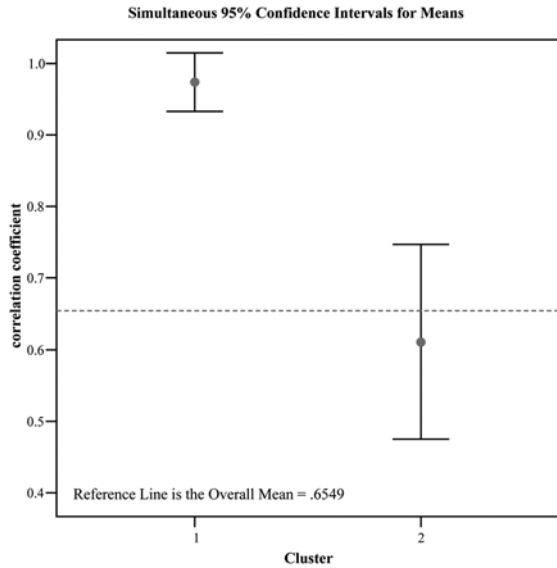


Figure 3. Variation of correlation coefficients

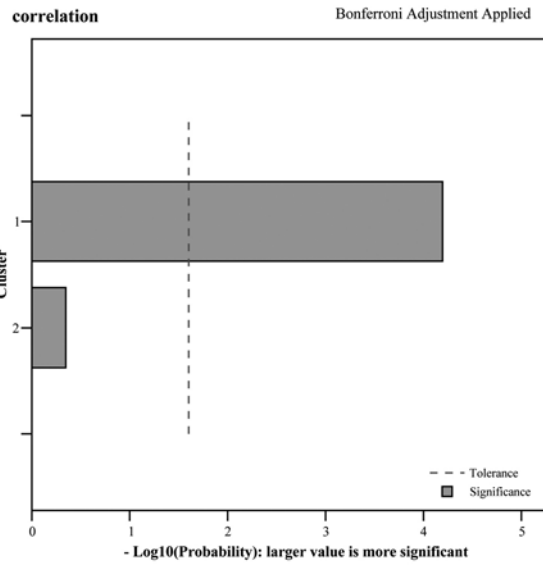


Figure 4. Correlation clusterwise importance

The importance of all ratios were significant statistically just for second cluster, for first cluster being not significant.

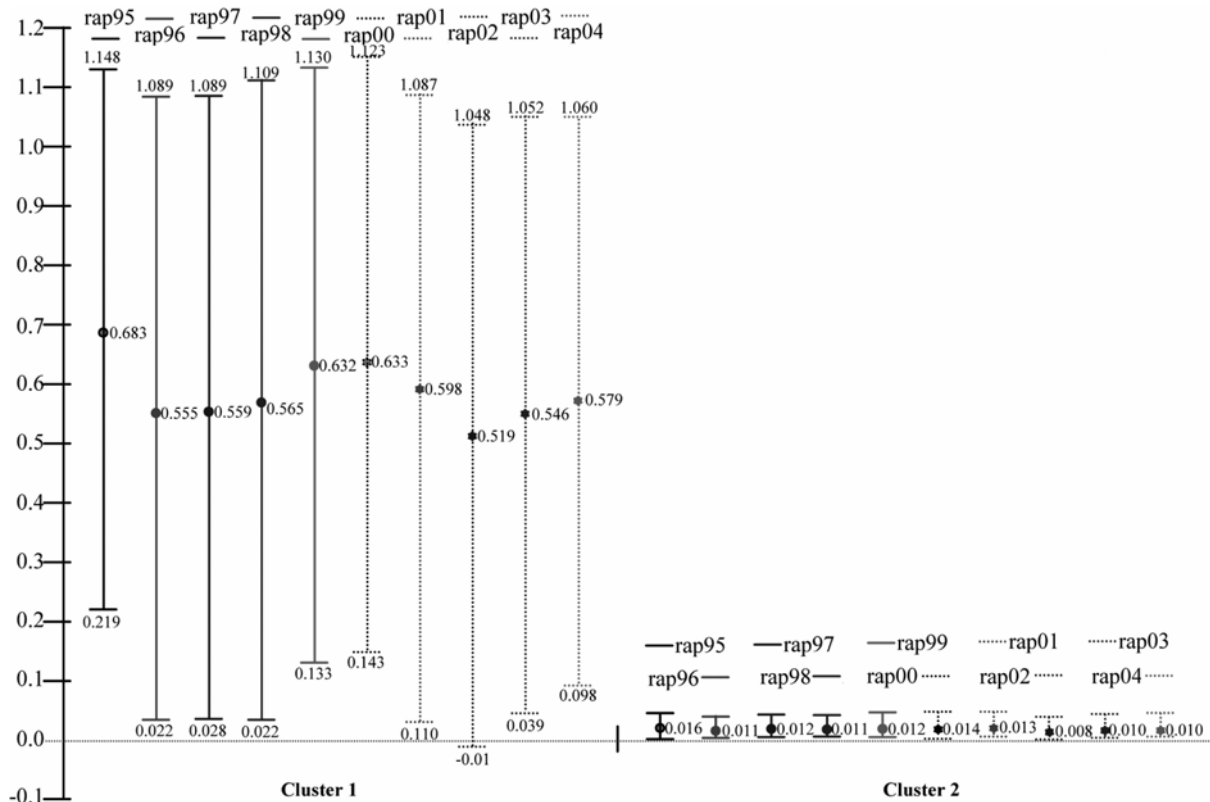


Figure 5. The importance of the ratios per year according with cluster

Discussion

The research reached its aim: the research management policy between 1995 and 2004 in Romania has been analyzed. The research has some limitations that were not necessary dependent by the research methodology, being related with the changes from the funding foundation. First observation refers the type of projects: (a) the AT projects has been introduced since 2000, (b) the BD projects has been introduced just since 2004, (c) the E project has been introduced since 2002, has not been finding again in 2003, but has been found in 2004, (d) TD projects has been introduced since 2002. Second observation refers the commission code: the seventh commission, Arts and Architectures, has been introduced in 2004. From these points of view, a more reliable analysis of all types of projects and on all commissions could be done just at the level of year 2004, which was not the aim of our research.

Analyzing the worst year according with the funding research it can be observed that in 2000 the research funds were less than the average with a coefficient of 0.55 while in the best year (2004) the funds were increasing with a coefficient of 2.41. A reliable comparison between the numbers of projects could not be done because the type A is the single type that was found since 1995. Even if the Medical Sciences is the commission that received less funds for research projects after the Art and Architecture commission (note that this commission has been introduced since 2004), the biggest amount of funds was in 1995 gave by this commission. From this could results that at the sixth commission, the number of funding research project is less comparing with the other commissions but the amount of funds on project is bigger.

Looking at the top three cities by total funding it can be observed that all of them are university cities and opposite the bottom, three cities are not university. None of the top three cities by total funding could be found in the top three cities by the total funding reported to the number of financial supported by NURC projects, but the bottom two cities by total funding maintained their place also on the bottom two cities by total funding reported to the number of financial supported by NURC projects. Two out of top three cities by total funds (Cluj-Napoca and Iasi) are also in the top three cities by total funds reported to the number of financial supported institutions and by number of financial supported reported to the number of financial supported institutions.

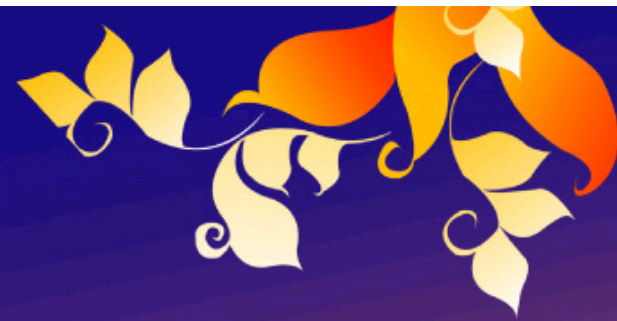
Analyzing the evolution of research funding for top cities in time (see figure 1), it can be observed the most important changes were at Bucharest, the Romanian capital with highest increases since 2002 comparing with Cluj-Napoca and Iasi. These three cities followed the same pattern on research funding from 1995 until 2004. These observations are more obvious by analyzing the funds relative to Bucharest, when the distance between Cluj-Napoca and Iasi on one hand and Alba-Iulia, Braşov, Târgovişte and Târgu-Mureş on the other hand is most obvious in figure 2 comparing with figure 1. A conclusion can be depicted from these observations: at the level of funding research, it can be talk about three cities (Bucharest, Cluj-Napoca, and Iasi) and the rest of the Romanian cities. This observation also results from table 2, from where another two city, Alba-Iulia (the first on top three cities by total funding reported to the number of financial supported by NURC projects) and Braşov (the third on top three cities by total funding reported to the number of financial supported by NURC institutions), can be added to the Bucharest-Cluj-Napoca-Iasi triad.

In order to identify the similarities between cities regarding the research funds received from 1995 to 2004, the two-steps cluster analysis technique was applied on the correlation coefficients between Bucharest funds and each other city funds and on the ratios of each city research funds reported to the Bucharest research funds. This method identified two clusters, one that included four cities (Bucharest, Cluj-Napoca, Iasi and Timisoara) and other that comprised the rest of the cities included into analysis. The correlation coefficient was the only variable that had a significant importance into clusterization (see figure 5). The differences between cities included into the analysis according with the studied variables and cluster membership is very well depicted and is obvious by analysis of figure 5.

As concluding remarks it can be say that, between 1995 and 2004, there was a pole of four Romanian university cities to which the majority of research funds were straightened, while the rest of cities received a small part of research funds. More, because the sixth commission accepted for financial support a less number of research projects comparing with the other commissions, a greater amount of money revenue to each funded project.

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Isroah
- 6.5 Attributes of effective economic instructors: a case study at Economic Education Department, Yogyakarta State University.
Losina Purnastuti
- 6.6 Pendidikan percukaian sebagai satu subjek di dalam sistem pendidikan negara: perspektif bakal guru.
Mohamad Ali Roshidi Ahmad & Mohd Asri Mohd Noor
- 6.7 Hubungan status sosio ekonomi ibu bapa dengan kefahaman konsep moral.
Mohamad Khairi Othman & Mohd Yahaya Mohd Hussin
- 6.8 Peran nilai moral dan nasionalisme dalam pendidikan di Indonesia.
Mudji Hartono
- 6.9 The accounting curriculum: a process to create effective leadership in job market.
Norizan Saad & Kamisan Gadar

- 6.10 Proses penerapan nilai murni guru perakaunan dalam melaksanakan pengajaran prinsip perakaunan.
Noor Lela Ahmad, Nor Aishah Buang & Norasmah Othman
- 6.11 Metode *problem solving* dalam pembelajaran mata kuliah pranata sosial.
Puji Lestari
- 6.12 Perbandingan pembelajaran koperatif dan tardisional terhadap prestasi dan konsep sendiri akademik dalam pendidikan perakaunan.
Rafiduraida Abdul Rahman & Norimah Rambeli
- 6.13 Persepsi pelajar terhadap kemahiran yang penting dalam kursus perakaunan.
Rohaila Yusof, Norasmah Othman & Faridah Karim
- 6.14 Asas pengetahuan dan pembangunan kemahiran dalam pendidikan perakaunan.
Shariffah Intan Syed Salleh & Syed Ismail Syed Mohamad
- 6.15 Pembelajaran ilmu pengetahuan sosial pasca berbagai bencana alam di Indonesia.
Suhadi Purwantara
- 6.16 Implementasi model pembelajaran *students teams achievement divisions* dalam mata kuliah strategi pembelajaran ekonomi.
Suwarno
- 6.17 Kesesuaian kurikulum perakaunan dengan kehendak tenagakerja: pandangan di kalangan pelajar dan pensyarah UPSI.
Syed Ismail Syed Mohammad, Syariffah Intan Syed Salleh, Fidlizan Muhammad & Khalid Ismail
- 6.18 Pengintegrasian konsep dan nilai pengelolaan air dan sanitasi lingkungan dalam pembelajaran IPS.
Yos Sudarso & Ucu Rahayu
- 6.19 Hubungan pendidikan percukaian dengan tahap kefahaman dan kebolehan pengisian borang cukai nyata pendapatan (Borang B): satu kajian kes di Tg. Malim.
Zuriadah Ismail, Mohd Shuhairy Mohd Noor & Mohd Nazri Hamzah
- 6.20 A study on factors that caused stress to the part-time master of accountancy students at UiTM.
Faridah Jaafar, Julianti Samsudin & Shanusi Ahmad

TRACK 7: INCORPORATING BUSINESS & ENTREPRENEURSHIP IN EDUCATION

- 7.1 Faktor-faktor pendukung keberhasilan berwiraswasta wanita menikah.
Aliyah Rasyid Baswedan
- 7.2 Kesediaan pelajar keusahawanan dalam membangunkan perniagaan sendiri.
Amal Hayati, Hariyaty Ab Wahid, & Norsamsinar Samsudin
- 7.3 Apprentice to businessmen in Indonesian history and culture tourism service.
Harianti
- 7.4 Orientasi pembelajaran melalui pengalaman dalam pendidikan keusahawanan.
Hariyaty Ab Wahid, Norsamsinar Samsuddin & Juliana Osman
- 7.5 Faktor-faktor pendorong usahawan wanita di daerah Kinta.
Loo Kam Lim & Kamisan Gadar
- 7.6 An attitude approach to the prediction of entrepreneurship on students in institution of higher learning.
Mohd Noor Mohd Shariff & Nordin Yusoff
- 7.7 Incorporating entrepreneurship in education.
Nasim Raza
- 7.8 Pemikiran keusahawanan dalam pengurusan pusat sumber sekolah (PSS): satu kajian tinjauan dikalangan guru media di daerah Kuala Selangor.
Noraini Mohamed Noh & Hariyaty Ab Wahid
- 7.9 Entrepreneurship: optimising contribution of vocational education in Indonesia.

- 7.10 Pelaksanaan dan kesan program siswa bistari terhadap inspirasi keusahawanan sebagai kerjaya pilihan: kajian kes di Universiti Teknologi Mara Johor.
Sharul Effendy Janudin & Ros Hasri Ahmad
- 7.11 Entrepreneurs Marketing Knowledge And Its Contribution Towards Companies Growth: The Malaysian Perspective.
Ahmad Mahmood

TRACK 8: TECHNOLOGY INTEGRATION IN BUSINESS EDUCATION

- 8.1 E-learning application in higher learning institutions in Malaysia: a Study of online live tutorial at Unitar Kota Bharu, Kelantan.
Abdul Manaf Bohari, Azham Hussain, Fazillah Mohd Kamal & Wan Marhaini Wan Omar
- 8.2 Model keupayaan dan gaya kognitif melalui animasi grafik dalam mata pelajaran teknikal.
Ahmad Rizal Madar, Norhanisha Yusof, Saifullizam Puteh & Yahya Bunta
- 8.3 Faktor-faktor keberkesanan penggunaan pendidikan dalam talian di Institut Pendidikan Tinggi.
Nurazariah Abidin
- 8.4 Multimedia Instructional design: an insight on the theory and practical applications.
Riaza Mohd Rias & Halimah Badioze Zaman
- 8.5 Why we need to use ITIL for better IT and business infrastructure management in Malaysia.
Shamsul Arrieya Ariffin
- 8.6 The implementation of e-learning preparation model by students of economic and cooperation-ut in archipelago areas.
Suhartono, Djahrudin & Sri Sumiyati
- 8.7 Development of tutorial kids for social sciences with multimedia for learning support services in distance learning.
Sri Sumiyati S
- 8.8 Process of business instructional within distance learning system.
Suripto, Rhini Fatmasari & Kusnadi
- 8.9 Optimum usage of technology in social sciences education.
Wia Z Nuzia
- 8.10. Online instructional clinic for professionalism teacher.
Sri Sumiyati, Suhartono & Djahrudin
- 8.11. A study on the on-line self-supervision system for improving teacher's instruction specialties.
Shin-cheon, Kang
- 8.12 A true experience in managing an e-learning program at UiTM
Syed Jamal Abdul Nasir Syed Mohamad, Rosmin Talib & Aini Faridah

TRACK 9: BUSINESS EDUCATION CURRICULUM DEVELOPMENT & REFORM

- 9.1 Pengembangan model pembelajaran keterampilan kewirausahaan berbaris social budaya bagi perempuan nelayan.
H. Anwar Hafid
- 9.2 Developing strategic management model of the Iranian higher education institutions.
Abdolrahim Navehebrahim & Mohammed Qahremani
- 9.3 Impact of African growth and opportunity act on sub-Saharan economic and political development.
Enoch K. Beraho

- 9.4 Subjek elektif kursus kejuruteraan elektrik: kajian keperluan dan keberkesanan di bidang kerjaya.
Saifullizam Puteh, Wan Norhidayah Wan Mohamed Noor & Ahamad Rizal Madar
- 9.5 The needs to re-engineer the entrepreneurship course activities.
Shamsul Arrieya Ariffin
- 9.6 Optimalisasi penerapan metode inkuiri dalam pembelajaran mata kuliah sejarah asia tenggara baru di program studi ilmu sejarah FIS UNY.
Terry Irenewaty

TRACK 10: ORGANIZATIONAL CHANGE & STRATEGIC MANAGEMENT

- 10.1 Towards pay for performance practice: transformational tool during Ut-Bhp.
Amalia Kusuma Wardini
- 10.2 Romanian higher education: modeling evolution tendencies.
Carmen E. Stoenoiu, Ioan Abrudan, Lorentz Jäntschi, & Sorana D. Bolboacă
- 10.3 Research policy via funding allocation analysis.
Lorentz Jäntschi, Carmen E. Stoenoiu, & Sorana D. Bolboacă
- 10.4 Halangan sebagai suatu alat konstruktif untuk pengurusan perubahan.
Muhammad Khairuddin Lim & Norsamsinar Samsuddin
- 10.5 Gaya Kepimpinan apresiatif pengetua wanita dan impaknya terhadap prestasi akademik, sikap pelajar dan sikap guru:satu kerangka konseptual kajian.
Nazirmuddin Ahmad & Hasani Mohd Dali
- 10.6 Gelagat pengurusan usahawan perusahaan kecil dan sederhana dan hubungannya dengan ciri-ciri keusahawanan.
Norsamsinar Samsudin, Muhammad Khairuddin Lim, & Mohd Taib Ariffin
- 10.7 Keadilan distributive bertindak sebagai moderator dalam perhubungan antara jenis faedah kerja dan prestasi kerja.
Clara Ong Guat Leng, Azman Ismail, Chong Siaw Joon, & Sheilla Lim Omar Lim
- 10.8. Impak imbasan persekitaran perancangan sumber manusia terhadap prestasi organisasi.
Sopian Bujang & Nek Kamal Yeop Yunus
- 10.9. Pembangunan "safety aptitude system" dalam meningkatkan keberkesanan modul latihan keselamatan pekerja.
Muhammad Nubli Abdul Wahab & Hafizoah Kassim
- 10.10. Sistem Pendidikan dan Pasaran Buruh: Faedah antara Jantina
Zulkifly Osman & Ishak Yussof

TRACK 11: QUALITY MANAGEMENT IN BUSINESS & EDUCATION

- 11.1 Pensyarah IPTS: hubungan antara kepuasan kerja, gaya kepimpinan dan tekanan kerja.
Hawa Rahmat, Mohd Rahimi Yusoff & Hazalizah Hamzah
- 11.2 Amalan prinsip-prinsip pengurusan berkualiti di sekolah menengah harian di daerah hilir Perak: satu perbandingan.
Munirah Abd Hamid & Kamarul Bahari Yaakub
- 11.3 Kualiti, kesedaran dan penerimaan perkhidmatan perbankan elektronik di kalangan kakitangan akademik politeknik.
Suzyanty Mohd Shokory, Mohd. Nazir Md. Zabir & Nek Kamal Yeop Yunus

