Assessing the alignment among the incentives, outcomes and impact of academia-industry collaboration in India: An academic perspective

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Abstract: Bringing academia and the industry together, to serve as a mechanism of change, channelizing the unique capabilities and capacities into a seamless intra and inter-play that models synergy in innovation and economic regeneration, has become quintessential. The present study focuses is on the involvement of the individual academics, working in select higher education engineering institutions of national importance (INI's) in India, with the firms in the automotive sector. The study focuses on three aspects of academia–industry collaboration process: the intellectual incentives, the outcomes of academia–industry collaboration and the impact of the outcomes on the core activities of the academic. The results showed that intellectual incentives serve as a significant driver in realizing the outcomes of academia-industry, especially in creating enhanced networks of knowledge creation and utilization and in developing greater insights into the problems faced by the industry. The results also show that the impact of the outcomes on teaching and research activity of the academic varies.

Keywords: academia-industry collaboration, partial least squares structural equation modelling, intellectual incentives, outcomes, impact of academia-industry collaboration.

1. Introduction

The last three decades have seen a significant surge in the creation and use of knowledge for economic leverage. The increased incorporation of knowledge in economic activity has resulted in significant structural and qualitative changes in the context of competition. The increase in the knowledge intensity, coupled with the increase in the ability to distribute, the knowledge in the world economy has resulted in redefining the basis of competition [1]. In the competitive scenario, knowledge embodied in the new products and services has become the primary source of wealth creation and competitive advantage.Without innovation and perpetual up gradation of technology, any economy is bound to lose its competitiveness [2].The increased emphasis on innovation systems has brought into focus policies relating to science and technology, industry and education. These policies address the concerns about the infrastructure investments in innovation, quality of workforce, integration of science and technology and transfer of technology. With knowledge recognized as a strategic resource and its creation and diffusion acknowledged as what can bring profit, the rise of academic capitalism is evident.

In the early 1990's, the development of knowledge economy led to an increasing reliance on the contribution by academia to the economic development, by way of focussing on the outcomes of academic research. Furthermore, studies have shown that knowledge transfer has become one of the most influential factors that increases the opportunities of technology commercialization [3]. This is mainly attributed to the fact that academia represents an insufficiently exploited repository of intellectual capital that continuously advances the frontiers of knowledge [4]–[6]. For research to contribute significantly in addressing the socio-techno-economic and environmental issues, collaborations between the researchers and the practitioners is necessary [7]. Studies have also established a link between innovative ability of a firm and collaboration with academia [8]–[10]. This has raised significant interest in the academia-industry collaboration for knowledge transfer, which primarily stems from the fact that collaborative research can be a leading source of innovation [11]–[13].Generally, firms regard academia as an alternate source of learning and may collaborate to reduce asset commitment, getting access to the technological skills, sharing the costs and spreading the risk of investment. Academics, on the other hand, regard firms as a breeding ground for future research and application and as an alternate source of funding. Academicsengage with firms in the industry to get ideas for future research, validate their research findings, to explore commercial application of the research output and to establish networks of knowledge creation and utilization.

In the contemporary scenario, an innovation has a short shelf life, thereby, necessitating continuous improvements in technology of products and services [14]. Any technological discontinuity in up-gradation or technology gaps resulting from the inability of firms to bridge the gap between technology and markets on their own has a considerable impact on the profitability of firms [15]. Thus, bringing academia and the industry together, to serve as a mechanism of change, channelizing the unique capabilities and capacities into a seamless intra and inter-play that models synergy in innovation and economic regeneration, has become quintessential.

Academia-industry collaboration in the Indian context

The higher educational system in India has played a significant role in the development the knowledge economy. With its differentiated three-tiered university system, it has offered a range of its offerings across different educational needs, while still maintaining the balance between excellence and equity. The Department of Higher Education, Ministry of Human Resource Development, has conferred the status of Institute of National Importance (INI) to seventy-four public higher education institutions in India by an act of Parliament[16]. While the government has supported these institutes whilefirms and other international institutes have contributed significantly contributed to develop centres of excellence in research and academics in these institutes. For India to continue its socio-economic progression, it has to reinforce its efforts in the discovery, development and diffusion of knowledge and technology through different mechanisms that bridge the gap between technology and the market.

2. Literature Review

Generally, academics response to engagement with industry is driven by two basic concerns, one, where utility maximization and commercialization is the prime concern and the other, where engagement is driven solely by the idea of receiving support for research [17], [18].

2.1. Incentives for academics to engage with industry

The impetus for an academic to engage with the firms in the industry has been attributed to the incentives and the characteristics of the individual academic [19].Both pecuniary and intrinsic incentives have motivated the academics [20].In a study of sustainable collaborative experience, intellectual and economic reasons have been cited for academics to engage with the industry[21]. In another study, pecuniary incentives have found favour in providing motivation for the academics to engage with industry, especially in life sciences, while non-pecuniary incentives stimulated academics in physical sciences[22]. In terms of pecuniary incentives, the importance of indirect support from the industry, especially when financial ties link to the research of the academic cannot be underestimated as an incentive in driving the academic to engage with industry[23]. Monetary incentives in the form of royalty payments have also attracted attention, assome universities have apportioned a higher share of royalty payments to faculty members, resulting in more efficient technology transfer activities[24].In a detailed study of academics in the UK, intellectual stimuli has been highlighted as a significant factor contributing to the decision of the academic to engage with the industry[6]. Presenting a parallel view, astudy of UK academics revealed that the opportunity for developing a practical application from the research output has also motivated the academic[25].In addition, in a study of the interactions between public research organizations and the industry in Latin America, intellectual and economic incentives have been advocated as the prime motivational factors that drive an academic to collaborate with industry[26].

2.2. Outcomes of academia-industry collaboration

The outcomes of academia-industry collaboration are the deliverables of the collaboration process and termed as the academic ‘take away’. The outcomes have been construed as the realized benefits that accrue from collaboration and broadly categorized as intellectual and economic. Apportioning the optimal stimulus to the academic to engage with the industry has resulted in alliances of value creation, yielding outcomes that are often aligned with the initial motivational drivers[27]. The outcomes of academia-industry collaboration have generally been shaped by a number of factors; characteristics of the academic, past collaborative experience of the academic, type of channels used, institution of the academic [28], [29]. In terms of preference, astudy of the benefits from collaboration between academia and the industry and channels of interaction used across Argentina, Brazil, Costa Rica, Mexico, Korea and India concluded that researchers placed more value on the intellectual benefits in comparison to the economic benefits[30].The outcomes of academia-industry collaboration have generally expressed in a number of ways - greater insights into industrial problems, joint publications, joint supervision of research theses, validation of research results and creation of networks of knowledge creation and utilization [11], [31], completion of live projects, establishing a network of knowledge creation and utilization, validation of research results, updating skills of the academic from exposure to business practices[21], [32]–[35]. The outcomes have also been expressed in terms of acquiring technical and scientific knowledge[13], [36], [37] eliciting financial support, training students and creating career opportunities for the students[38], [39].

2.3. Impact of the outcomes of academia-industry collaboration on core activities of the academic

The impact of the outcomes of academia-collaboration is the value addition, generally expressed in terms of the improvement in the quality of teaching and in creating new avenues for research and commercialization for the academic. Although, the impact of the outcomes of academia-industry collaboration has been well researched in terms of the impact on the research, the impact of such engagements has on teaching has been researched in a limited way.It has been advocated that academics more active in academia-industry collaboration have extended significantly stronger support to students in their entrepreneurial endeavours that contributed to developing student competence[40]. In a study of UK academics, the engagement of the academics with external organizations resulted in strengthening the core missions of the academics, namely teaching and research activities, although the impact on teaching was not the same as that on research[6].Academia-industry collaboration have also resulted in yielding valuable insights for the academics, opening up new avenues for future research collaborations [21], [41], [42].

3. Research model

In this study, we consider the intellectual incentives as a set of drivers that lead an academic to engage with the industry. The intellectual incentives relate to the anticipated benefits and serve to stimulate the academic to participate in the collaboration process. The present study considers intellectual incentives as the sole impetus for the academic. Adapting fromthe conceptual framework proposed for Latin American countries, regarding the alignment of the benefits of academia-industry collaboration with the initial motivation of the academic to engage[43], we establish a relationship between intellectual incentives and intellectual outcomes and their corresponding impact. In this study, we posit that the intellectual incentives drive an academic to collaborate with firms in the automotive industry, leading to outcomes that enhance research insight and network activity and enhance joint research activity (see Figure 1). The study further examines the extent to which the outcomes of academia-industry collaboration add value in teaching and research activity of the academic.

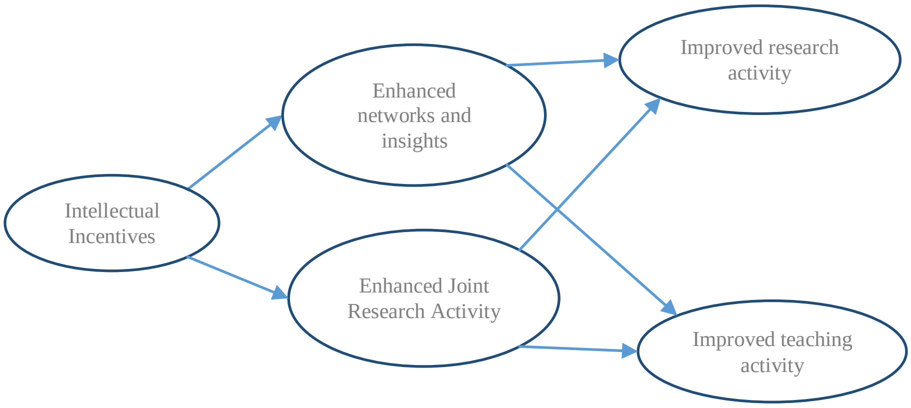


Figure 1 Research model

This leads to positing the following hypotheses:

H_{1a} Intellectual incentives for the academic to engage with the industry have a positive effect on the outcome of enhanced research insight and network activity.

H_{1b} Intellectual incentives for the academic to engage with the industry have a positive effect on the outcome of enhanced joint research activity.

H_{2a} Enhanced research insight and network activity resulting from academia-industry collaboration have a positive effect on teaching activities of the academics.

H_{2b} Enhanced research insight and network activity resulting from academia-industry collaboration have a positive effect on the research activity of the academic

H_{3a} Enhanced joint research activities resulting from academia-industry collaboration have a positive effect on teaching activities of the academics.

H_{3b} Enhanced joint research activities resulting from academia-industry collaboration have a positive effect on the research activity of the academic.

4. Research methods and data

4.1. Empirical setting and data

The study has been based on data collected through an online survey of individual academics working in select higher education engineering institutions of national importance (INI's) in India in 2014. The survey questionnaire wasdeveloped to capture information regarding the characteristics of the individual academic, in general, and the details of their collaboration with firms in the automotive industry over the last three years, in particular.Prior to its launch, the questionnaire was pre-tested and,based on the feedback, the questionnaire was shortened.The study identified 1500 academicians in seven engineering disciplines in forty INI's. The respondents were invited to voluntarily participate in the study by sending an email that contained the embedded URL.The initial response rate was low and after two weeks, a second email was sent that invited those who had not responded to complete the questionnaire. Another reminder to solicit responses followed this. The data received was screened for case and variable for missing values and biased responses. There were 42 missing values in the dataset, for which we performed the Little's MCAR test [44]. The results indicated that these values were missing completely at random and any imputation method could be used to replace the missing values. A regression imputation method was applied to ensure that the replaced values were consistent with the existing relationship structure in the dataset [45]. Overall, we received 129 usable responses to our solicitations,58.9% responses from Indian Institutes of Technology (IIT's) and the remaining from National Institutes of Technology (NIT's).

4.2. Measures

Extant literature was used to establish item scales for each construct. The construct intellectual incentives, based on the 'anticipated benefits', was developed from previously validated studies on items [6], [19], [21], [27]. Intellectual incentives, a reflective construct,was measured on the basis of six items in an online questionnaire. The responses from individual academics were sought to the following question in the online survey: 'To what extent did the following factors influence your decision to interact with the industry'? Respondents were asked to rank the importance of each item of the construct on a five point Likert scale, ranging from 'not at all' (1) to 'most of all' (5). The outcomes of academia-industry collaboration, theorized as deliverables,weredescribed as the benefits realized by the academic. This construct wasalso adapted from previously validated studies of the UK academics [6], [21] and five items were used to measure the construct.Responses from individual academics were sought to the following question in the online survey: 'Please indicate the extent to which the following outcomes were realized through your interactions with the industry'. Respondents were asked to rank the importance of each item of the construct on a five point Likert scale, ranging from 'not at all' (1) to 'most of all' (5). The impact of academia-industry collaboration was measured in terms of the impact of the outcomes of collaboration on the core activities of the academic, namely teaching and research. The improved teaching activity, a reflective construct, was measured based on five items and the other reflective construct, improved research activity,was measured on the basis of seven indicator items in an online questionnaire. The responses from individual academics were sought to the following question in the online survey: 'To what extent did the outcomes of your interactions with firms in the automotive sector impact the work related to teaching activity'? Similar question was posed to respondents for eliciting information regarding research activity. Respondents were asked to rank the importance of each item of the construct on a five point Likert scale, ranging from 'not at all' (1) to 'most of all' (5).

The item loadings on each construct have been shown in Table A.1 of Appendix A

In terms of the distribution of academics', the sample constituted 28% professors, 25% associate professors and 47% assistant professors. In terms of the academics' field, the sample included 37% academicians from mechanical engineering, 14% from metallurgy and material science and engineering, 16% from electrical engineering, 6% from computers and 3% electronics engineering, 8% from chemical and 8% from design engineering. In terms of the type of research, 28% of the academicians in the sample were involved in applied research, 35% in basic research, and 37% in user oriented applied research.

4.3. Method

The study draws on variance based PLS-SEM approach. PLS-SEM approach is a multivariate analysis method based on a series of ordinary least squares regressions. The PLS-SEM approach has higher levels of statistical power than its covariance-based counterpart, does not assert the requirements of multivariate homogeneity and normality on the data and is suitable for studies with small sample sizes[45]–[47]. This technique has been found to be suitable for assessing the measurement model in order to determine the properties of the scales used to measure the variables in the model, as well as for evaluating the structural model to establish the important relationships among the variables. Since none of the variables on which data has been collected qualifies as an instrument variable, the use of PLS-SEM is merited in our model set-up. Also, as PLS is a non-parametric procedure, a bootstrapping procedure drawing on 129 cases and 5000 re-samples and using 'no sign change option' was performed for significance testing for the loadings.

5. Model estimation and result evaluation

SmartPLS 3.2.0 has been used to compute the path model. The estimation of the parametershas been carried out on the basis of path weighting scheme and in evaluating and reporting the results, the guidelines for PLS-SEM given by[46], [48]have been used.

5.1. Measurement model

5.1.1. Reflective measurement model assessment

The model considers five reflective constructs, each of which was assessed for reliability and validity in the measurement model analysis. The analysis involved assessing the internal consistency and the construct measures' indicator reliability as well as convergent and discriminant validity. On running the PLS algorithm, all the indicators in the five reflective constructs, except two, exhibited a loading of above 0.70, with two exceptions, indicating items indicator reliability. The indicators, 'it strengthened your reputation as a teacher' (cit2) in the construct 'improved teaching activity' and 'it strengthened your reputation as a researcher' (cir2) in the construct 'improved research activity', exhibited a slightly lower loading of 0.563 and 0.524 respectively. The two indicator items were removed from the respective constructs. The composite reliability (CR) values of the five reflectively measured constructs was above 0.7 and all the Cronbach's alpha above 0.6, providing evidence of the construct measures' internal consistency reliability (see Table 1). Thus, indicators in the reflective measurement model showed satisfactory levels of indicator reliability. Similarly, the average variance extracted (AVE) of all the reflectively measured constructs was higher than the critical threshold value of 0.50, lending support for the measures' convergent validity (see Table 1). Ensuing convergent validity, two approaches were used to assess the reflective constructs' discriminant validity. First, the cross loadings of the indicators were checked to confirm that no indicator loaded higher on any opposing construct. Thereafter, using the Fornell and Larcker criterion, the discriminant validity was checked by comparing the AVE of each construct with the squared inter construct correlation of that construct with all the other construct in the structural model[49]. As none of the constructs exhibited shared variance with any other construct that was greater than its AVE value, the reflectively measured constructs in the model exhibited discriminant validity (see Table 1). Both assessments yielded that the reflective constructs exhibited discriminant validity.

Table 1 Measurement model analysis

				Fornell & Larcker Criterion for Discriminant Validity				
	Cronbach's Alpha	CR	AVE	Enhanced Joint research Activity	Enhanced Network and Insights	Improved Research Activity	Improved Teaching Activity	Intellectual Incentives
Enhanced Joint Research Activity	0.867	0.938	0.882	**0.939**				
Enhanced Network and Insights	0.870	0.920	0.794	0.577	**0.891**			
Improved Research Activity	0.889	0.915	0.642	0.537	0.776	**0.801**		
Improved Teaching Activity	0.911	0.938	0.790	0.510	0.771	0.694	**0.889**	
Intellectual Incentives	0.889	0.915	0.644	0.316	0.728	0.592	0.575	**0.802**

5.2. Structural model

A step-by-step analysis of the structural model was carried out. First, we focused on the relationship the intellectual incentives, the outcomes, and the impact of the academia-industry collaboration. The structural model estimation showed coefficient of determination R^2 as the central criterion for the structural model's assessment, as shown in Table 2. The results showed a high value of R^2, 0.614 and 0.601 for the target constructs, namely 'Improved research activity' and 'Improved teaching activity' respectively, substantiating the model's predictive validity (Hair et al. 2014). Following this, a blindfolding procedure with 300 iterations with omission distance of 7 was run, obtaining 0.355 and 0.418 as the Stone Geisser's Q^2 values for'Improved research activity' and 'improved teaching activity' respectively. The Stone Geisser's Q^2 values for 'enhanced joint research activity' and 'enhanced research insights and networks' were 0.079 and 0.157 respectively. Since each of the Q^2 values were above zero, the blindfolding procedure provided evidence of the model's predictive relevance [50].

Table 2 Quality criterion results for the structural model

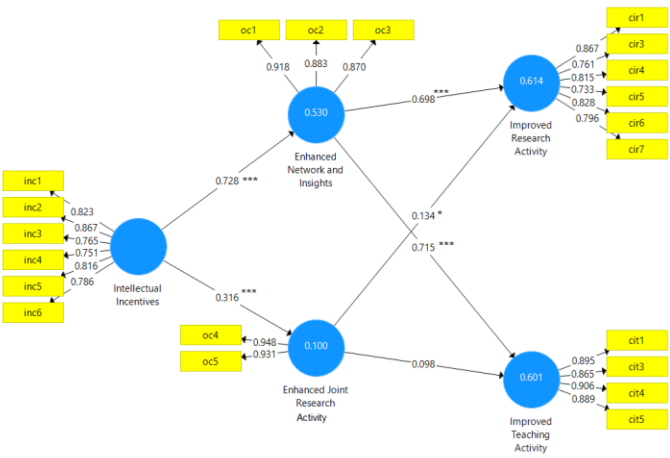
Constructs	R^2	**StoneGeisser's** Q^2
Enhanced Joint Research Activity	0.100	0.074
Enhanced Network and Insights	0.530	0.390
Improved Research Activity	0.614	0.358
Improved Teaching Activity	0.601	0.439
Intellectual Incentives	-	-

For testing the statistical significance of the path coefficients in the model (see Table 3), a bootstrapping procedure with 129 cases and 5000 re-sampleswas carried out.The results of the bootstrapping procedure revealed the path coefficient between academics' intellectual motivational driver and the outcome of enhanced networks and insights resulting from collaboration was highly significant (0.728, p = 0.000), and that between intellectual motivation and outcome of enhanced joint research activity resulting from collaboration was also highly significant (0.316, p = 0.002).

Table 3 Structural model analysis

	Original Sample (O)	*t*-Statistics	*p* Values
Enhanced Joint Research Activity → Improved Research Activity	0.134	1.755	0.079
Enhanced Joint Research Activity → Improved Teaching Activity	0.098	1.320	0.187
Enhanced Network and Insights → Improved Research Activity	0.698	11.052	0.000
Enhanced Network and Insights →Improved Teaching Activity	0.715	11.358	0.000
Intellectual Incentives → Enhanced Joint Research Activity	0.316	3.042	0.002
Intellectual Incentives → Enhanced Network and Insights	0.728	12.677	0.000

Highly significant path coefficients were also evident in the relationship between the outcome of enhanced research insights and networks and its impact in improving research activity of the academic (0.698, p = 0.000) and the relationship between the outcome of enhanced research insights and networks and its impact in improving teaching activity of the academic (0.715, p = 0.000). In the case of the relationship between the outcome of enhanced joint research activity and impact of improved research activity, the path coefficient was weak and only significant at 10%. The path coefficients depicting the relationship between the outcome of enhanced joint research activity and impact of improved teaching activity, however, was non-significant (0.098, p = 0,187). Figure 2 shows the estimate of the path model depicting the various relationships among intellectual incentives, the outcomes of academia-industry collaboration and the impact of the outcomes on teaching and research activity of the academic.



*** $p \leq 0.01$; ** $p \leq 0.05$; * $p \leq 0.10$

Figure 2 Structural model and PLS-SEM estimates for Model

It is evident from the results that the intellectual incentives for the academic have a significant influence in developing the networks of knowledge creation and utilization and in creating a window for the academic to develop greater insights into the problems related to the industry.Based on the results of the Bootstrapping procedure, five out of the six hypotheses have been validated, as shown in Table 4.

Table 4 Results of the hypotheses testing

	Hypotheses	Results
H_{1a}	Intellectual incentives for the academic to engage with the industryhave a positive effect on the outcome of enhanced research insight andnetwork activity.	Supported
H_{1b}	Intellectual incentives for the academic to engage with the industryhave a positive effect on the outcome of enhanced joint researchactivity.	Supported
H_{2a}	Enhanced research insight and network activity resulting from academia-industry collaboration have a positive effect on teaching activities of the academics	Supported
H_{2b}	Enhanced research insight and network activity resulting from academia-industry collaboration have a positive effect on the research activity of the academic	Supported
H_{3a}	Enhanced joint research activities resulting from academia-industry collaboration have a positive effect on teaching activities of the academics	Not Supported
H_{3b}	Enhanced joint research activities resulting from academia-industry collaboration have a positive effect on the research activity of the academic	Supported

To identify the impact of latent variables having a high importance and relatively low performance on an endogenous latent variable, we extended the findings of the analysis of the structural model and built the impact-performance matrix analysis (IPMA). The results showed a priority map to improve performance of the target constructs, namely improved teaching activity and improved research activity of the academic. Figure 3 depicts the results of IPMA.

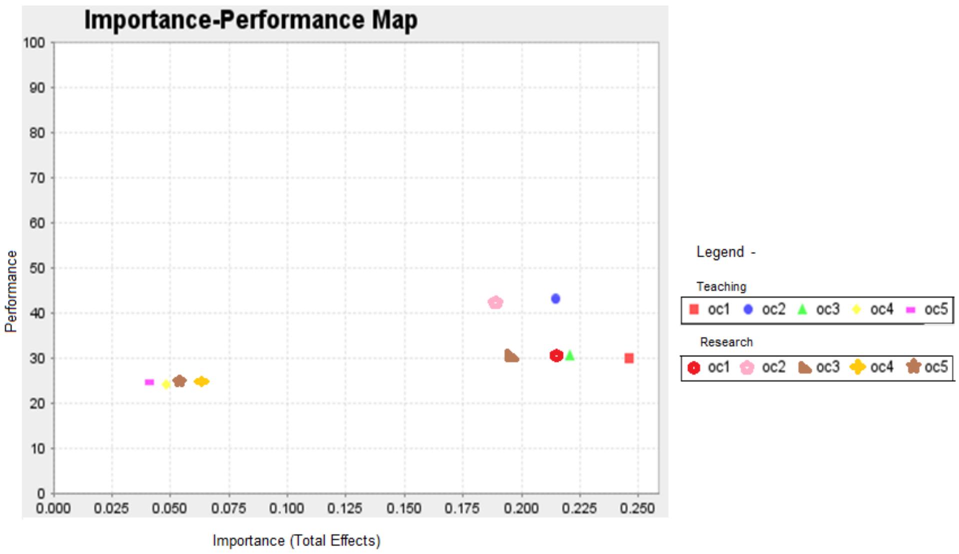


Figure 3 IPMA results of the target constructs

It is evident from the IPMA that for both ‘improved research activity’ and ‘improved teaching activity’, the two highest performances are derived from the outcome ‘Greater insights into the practicality of industrial problems’(oc2). The results show that even though the performance of the outcomes ‘access to networks of knowledge creation and utilization’ (oc1) and ‘validation of your own research results’ (oc3), in improving the teaching and research activity of the academic is comparable, the importance attached to teaching is marginally higher than that for research. Overall, the most important variables for both ‘improved research activity’ and ‘improved teaching activity’ are ‘oc1’, ‘oc2’ and ‘oc3’. Interestingly, the outcomes ‘joint academic-industry research publications’ (oc4) and joint academic-industry supervision of Ph.D. and Masters’ Theses’ (oc5) have a significantly lower importance as well as contribution in improving the teaching and research activity of the academic.

6. Findings and conclusions

The objective of the study was to determine the effect of intellectual incentives on the outcomes of academia-industry collaboration and the corresponding impact of the outcomes on the core activities of the academic, namely teaching and research. The results showed that intellectual incentives is a significant driver in shaping the outcomes of academia-industry, especially in creating enhanced networks of knowledge creation and utilization and also in developing greater insights into the problems faced by the industry. The results also show that the impact of the outcomes on teaching and research activity of the academic varies. Although, the enhanced networks and insights have a significant influence in the research and teaching activity of the academic, enhanced joint research activity does not influence the teaching activity of the academic and only marginally influences the research activity.

This study offers several insights into the academia-industry collaboration from the viewpoint of an academic. First, our findings contribute to the development of the academics' perspective about engaging with the firms in the automotive industry by identifying the intellectual incentives that, on the one hand, significantly lead to enhancing the networks of knowledge creation and utilization and on the other augment joint research activity. These results concur with some of the previous studies [6], [21], [51]. Second, our study reveals that the impact of the enhanced networks and insights has a marginally stronger influence on the teaching of the academic, than on research.This evidence suggests thatimproving the research networks and developing greater insights in the world of industry not only improvesthe pedagogy of the academic but also provides avenues for future research.With respect to the outcome of enhanced joint research activity, the impact seems to be subdued for teaching activity of the academic, although, it marginally influences the research activity of the academic. This indicates that the academic take away from enhanced joint research activity is more dedicated to researching industry problems, with little pedagogical scope.

7. Limitations

First, the research was limited to select engineering INI's in India, which limitsthe extent to which the results can be generalized. In addition, the present study is a cross-sectional study. To reflect a realistic picture,studies based on longitudinal data captured from across the academic institutions will be useful. Further, the findings in the study are based on a modest sample size of 129 responses. Although, PLS path modelling technique has been found to be suitable to adequately handle small sample sizes[52], a larger sample of the academicians would possibly lead to more robust results.

8. Future research implications

While our study offers important insights into research on academia-industry collaboration, it offers several avenues for further research. First, our focus was on the influence of the intellectual incentives on the collaboration outcomes and the subsequent impact of the outcomes on the core academic activities. Future research may further explore the influence of economic incentives; in addition to the intellectual incentives on the outcomes of academia-industry, collaboration can be investigated. In addition, the outcomes can be expanded to include deliverables that cater to the economics of collaboration. The role of past collaborative experience of the academic and the use of different channels of interaction in realizing the outcomes of academia-industry collaboration can also be explored. In addition, as the academics link with firms in the industry through specific channels of interaction, considering the industry view in the use of channels of interaction would perhaps result in better alignment and cohesion between the two actors

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Appendix A.1

Table A.1 Items loading on the constructs in the model

Intellectual Incentives	inc1 - To test the practical application of your research inc2 - To gain insights in the area of your own research inc3 - To keep up to date with research in the enterprise in the industry inc4 - To secure access to specialist equipment, materials or data not available in your institution inc5 - To secure access to the expertise of researchers working in enterprises inc6 - To gain knowledge about practical problems that the enterprise, in particular, and the industry, in general, confronts
Enhanced Networks and insights	oc1 - Access to networks of knowledge creation and utilization oc2 - Greater insights into the practicality of industrial problems oc3 - Validation of your own research results
Enhanced Joint research activity	oc4 - Joint academic – industry research publications oc5 - Joint academic – industry supervision of Ph.D. and Masters' Theses
Improved Teaching activity	cit1 - It has led you to propose/make changes in the course program cit2 - It has strengthened your reputation cit3 - It has led to changes in the way you present the material in class cit4 - It has led to an increase in the employability of your students cit5 - It has led to an increase in entrepreneurial skills among your students
Improved Research activity	cir1 - it has led to new research projects in your field cir2 - It has strengthened your reputation in your field of research cir3 -It has led to the creation of Proprietary knowledge (IPR's) cir4 -It has led to commercialization of your research results cir5 -It has led me to start up a new business (spin-off) cir6 -It has given me new insights for your work cir7 - It has led to new contacts in the field