European Journal of Management, vol. 22, issue 1, pp. 49-58.

OPPORTUNITY COST AND INCENTIVE SYSTEMS

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ABSTRACT

The case study illustrates management accounting issues in higher education organizations. It particularly addresses the benefits of planning research projects with activity-based costing instead of absorption costing. The case continues by explicating hidden transfer pricing systems and opportunity cost in higher education. Students can discuss how small misalignment in management control system leads to unintended and dysfunctional behavior. The case offers opportunity to explore non-financial incentives in the public sector.

Keywords: *Activity-based costing; incentives; transfer pricing; higher education; instructional case study.*

1 INTRODUCTION

Klever Business School (KBS) is a European, research-oriented university that offers business degrees from the undergraduate to the postgraduate level. Its campus is located in the city center of a large, vibrant town. KBS is a public university that must use all its funds for creating an inspiring learning and research environment that has a positive impact on society. Its funding mainly stems from the state (based on number of student intake, as well as research output), and organizations (both for profit and non-for profit) who provide external funding for cooperation on projects. KBS has set as its goal to increase the number of PhD graduates, as well as the research output that has value to society.

2 ACTIVITY-BASED COSTING (APPROX. 45 MINUTES)

Kirby Cooper from KBS' cooperation department helps professors in setting up contracts with organizations that want to provide external funding to KBS. Elena Ford is a professor of Marketing. One of her brightest Master students this year would like to continue as a PhD student. This student has worked part-time for a digital marketing agency (DMA) for many years. Elena proposes a highly innovative, three-year project that is of interest to both KBS and DMA, and it would have substantial value to society. She and DMA agree that DMA provides funding for a part-time PhD position, if the students keeps working at the DMA for one day a week. Kirby develops a contract that lists the external funds DMA would have to pay.

Cost type	**Cost per year** *[EUR]*	**Total cost (3 years)** *[EUR]*
PhD student salary (incl. fringes)	36,000	108,000
Overhead on salary (45%)	16,200	48,600
Cost of project	**52,200**	**156,600**

Elena and DMA agree that the salary is justified. However, they do not understand how a PhD student would incur such an amount of overhead at KBS. Elena makes some calls to find out.

> Kirby justifies himself to Elena: "*Besides the PhD salary including fringes[1], I always apply an overhead rate, so KBS does not run a deficit. The overhead rate covers the PhD's office, their IT equipment, the administrative support they need, and… ehm… well… what else?… you know, complex accounting stuff! Many years ago, a government report added up all personnel-related overheads across all universities in the country and divided them by the direct personnel cost from the janitors to the rector, and that is where the overhead rate comes from.*"
>
> Elena calls Rex from KBS' real estate management: "*What, another PhD student? Oh no! We are fully booked for the next three years. Of course, you could rent a desk for the student at the co-working space next door for about 300 EUR per month. That is a fair price that should correspond to our internal cost at KBS. But KBS is not allowed to pay for external office space, that is a policy from the ministry of education.*"
>
> Ida from IT tells Elena: "*If you want to have a nice IT package that lasts for one PhD project, I have to order a new one for 1,800 EUR max. At a public university, there are spending limits. This is why many PhD students buy their own, fancier equipment.*"
>
> Harry from human resources mumbles: "*The amount of work we have with your PhD student? OK, just a rough estimate here: The contract and setting up the personnel file take two full work days of 8 hours. Our rate is 50 EUR per hour… probably? I estimate one day a year for the performance review, vacation/sick day registration. Pay slips are automated, your student would not add extra cost. And graduation, PhD certificate, travel for assessment committee… I would say these three items are an extra, one-off payment of 2,100 EUR on top of what I said before.*"

Required

1) Based on the interview information, re-calculate the total, three-year cost of the PhD project using Activity-based Costing (ABC).
2) Elaborate on two faulty assumptions of Kirby's overhead rate.
3) Kirby cannot think of any other cost beyond the ones that Elena listed. Additionally, DMA even offered a free office and IT equipment at the DMA building close to KBS's campus. Still, Kirby appears insecure about ABC and insists on using his calculations for the contract. Highlight two positive aspects that switching to ABC would entail for KBS (without explicitly criticizing Kirby's approach).

[1] Fringes are fees for social security such as employee pension, health care plans, and unemployment.

3 TRANSFER PRICING (APPROX. 40 MINUTES)

In order to produce more, meaningful research, KBS wants to increase the number and quality of KBS-internal research courses for PhDs. The dean's general teaching guideline at KBS is that professors should devote 60% of their time to Bachelor programs, 25% to Master programs, and 15% to other programs such as executive / postgraduate education. However, professors are by law relatively free to choose which courses they would like to offer, how they organize the courses, and if they accept thesis supervisions. Professors have a teaching budget of 900 hours per year. A norm catalogue determines how many hours a professor can budget for each teaching activity. The norm catalogue was the result of a difficult, highly political negotiation process during a 2-day strategy meeting. The meeting hosted 15 diverse staff members who – in absence of any data – have used their judgment, expertise, and gut feelings to forge a compromise. A simplified version of the norm catalogue is shown below:

Education activity	**Norm unit**	**Chargable hours** [h]
Teaching (Bachelor; Master)	teaching hour	4.0
Thesis supervision (Bachelor) - Duration: 10 weeks for 20 pages with one supervisor	thesis	20.0
Thesis supervision (Master, only as primary supervisor) - Duration: 25 weeks for 60 pages with two supervisors	thesis	24.0
Thesis supervision (PhD, only as primary supervisor) - Duration: 3 years for 400 pages with two supervisors	year	50.0
Evaluation thesis (Bachelor; Master; PhD)	thesis	10.0
Evaluation exam (Bachelor; Master) - any type	exam	0.5
Note: All theses require monthly meetings (PhD meetings with written documentation). *Master theses and PhD theses require a public defense and documented feedback sessions.*		

At the faculty meeting, a discussion unfolds why the PhD education lacks attention, among other imbalances.

> Dean Biz, dean of the business faculty, says: "*Almost no professor volunteers to teach PhD courses. They all want to teach, examine and supervise Bachelor theses. Our PhD students are only allowed to teach, examine and supervise at the Bachelor level, so there is no work left for them. Master students tell me that they do not find 2nd supervisors. And since we got the automated grading software, most exams have turned into multiple choice.*"
>
> Elena adds to his concerns: "*We professors love research and working with graduate students. But according credible data from KBS' workplace survey, we already work 30-40% overtime compared to our employment contracts, including administration, publishing, funding acquisition and outreach to society.*"

Required

4) Argue why this norm catalogue could be seen as a transfer pricing system *[hint: what are the services delivered, by whom, and how are they paid for?]*, and characterize its features and effectiveness according to a framework of your choice.
5) Discuss <u>two</u> (possibly connected) transfer-pricing-related initiatives that would increase professors' capabilities and willingness to contribute to the PhD education.

4 INCENTIVE SYSTEMS (APPROX. 35 MINUTES)

The next issue in the faculty meeting is to motivate professors to teach in the executive education program where companies pay KBS to give short seminars to their managers. It is usual that professors prepare (and follow up) approximately 4 full days for each day they teach in executive education, since they should customize their teaching material to the companies of the participants. The program constitutes a highly profitable source of funding for KBS. Participants pay high fees, which also makes them quite demanding. Dean wants to create an incentive system to motivate faculty to teach in executive education. Instead of charging teaching hours from the professors' budgets, Dean wants to pay them 80 EUR per hour that they actually teach in in class (a teaching day has 8 hours). Professors receive a 15% bonus on this base payment if the course evaluation scores among the top 5% of all course evaluations at KBS, and another 10% on this base payment if no participant fails the course.

Elena has a contract at KBS for a six-day week, of which she is allowed to use one day a week for her own entrepreneurial endeavors. This could be teaching in executive education, or accepting work as a freelancer. Her marketing concepts are popular with multinational corporations, and they offer her more work than she could handle. Her rates start at 1,000 EUR a day, and she is paid for all her offsite preparations as well. Elena's colleagues have similar opportunities.

Required

6) Dean offers Elena a one-day teaching opportunity. Elena expects that all participants will pass, but she is not sure to get a top 5% evaluation. Calculate her total expected payment.
7) Calculate the minimum hourly rate Dean would have to pay Elena to make her indifferent between teaching in executive education and being a freelance consultant.
8) Discuss the overall effectiveness of Dean's bonus system. Discuss three weaknesses (or areas for improvement).

5 DISCUSSION

This section contains suggested solutions, but other solutions might be feasible as well. Solutions are numbered as the requirements are above.

SOLUTION 1 (APPROX. 15 MINUTES)

The ABC system shows a favorable variance compared to the existing absorption costing system of -37,800 EUR (-24%) for the entire project. If DMA uses its idle office and hardware, the favorable variance increases to 48.600 EUR (-31%). Going systematically through the costs the PhD student incurs shows that the existing system is overcharging partner organizations. Students should show the following calculations:

Cost type	**Cost per year** *[EUR]*	**Total cost (3 years)** *[EUR]*
PhD student salary (incl. fringes)	36,000	108,000
Office rent	3,600	10,800
IT equipment	600	1,800
HR support (setup)	267	800
HR support (ongoing)	400	1,200
Graduation	700	2,100
Cost of project	**39,600**	**118,800**
Favorable variance to absorption costing		*- 37,800*

SOLUTION 2 (APPROX. 15 MINUTES)

Students can criticize many aspects of Kirby's absorption costing system. They should elaborate on two of the following options (or others) and give examples:

- Low reliability: Kirby's phrasing suggests that he does not exactly know what this rate covers, or should cover. He should be aware that charging for an overhead may entitle the PhD student or DMA to use it.
- Low validity: The overhead rate has been calculated across all staff members, even though professors and the leadership probably consume – even relative to their higher salary – disproportionally more and/or different overheads than a janitor or a PhD student. This leads to overcosting the rate for the PhD student.
- Low validity: The data is highly aggregated at the national level. KBS cost structure is probably not correspondent to this. Moreover, KBS teaches business, which is a cheap 'book science'. The overhead also covers expensive 'lab sciences' like medicine and natural sciences. This overestimates the overhead cost for KBS' business studies.
- Disregard of the relevant range of the cost function: Very likely, the cost of office space makes up a large amount of the overhead. But KBS does not have any more office space. This puts the appropriateness of the student's workspace into question. KBS might also have to justify toward MDA or the state's internal revision why they charge for non-existing assets.
- Outdated data: The overhead rate is old and obviously outdated. Cost structures at the university will certainly have changed due to restructuring, automation, and change in course offerings.
- Cost behavior: The allocation base is not the true cost driver. The interviews signal that the activities of the PhD student (booking vacation; ordering hardware; graduating; …) trigger resource consumption. The amount of salary is unrelated to this. If MDA decided to fund a full-time position, overheads would double, even though the student would not consume more overhead resources.
- Idle capacity: the absorption costing system does not check which capacities are idle, and would thus not incur additional cost if used by the PhD student. For instance, the pay slips are generated automatically and do not incur extra cost. Probably, the Enterprise Resource Planning system that processes them has a very high annual fee. But its cost needs to be covered by the permanent staff. It cannot depend on insecure, optional projects.

SOLUTION 3 (APPROX. 15 MINUTES)

ABC has many advantages for pricing funding projects at a university. Students should be able to identify two of these (or others) and give examples:

- Strategy alignment: KBS has a specific strategy of creating societal impact through research and teaching. Any costing system makes assumptions how costs behave. When they are the base for pricing or allocating resources, costing systems cannot be seen as impartial. They must align with the strategy. Elena and Kirby agree that the direct cost have been covered, and most of the indirect cost. The costing

system should not deter KBS to work on this societal meaningful project because of inexplicable overhead rates.

- Strategic positioning: The absorption costing system overcharges funding partners. They might decline cooperation altogether, such as DMA is considering it now. This might lead to idle resources that the absorption costing system – once updated – will price into new offers. These will be even more overcosted, driving demand down even further.
- Transparency: The suggested ABC system is more transparent on how KBS will use the funds of DMA for research purposes. The system is helpful in convincing organizations of cooperation. It also would help in reporting to external stakeholders, such as the ministry during an internal audit.
- Decision facilitation: The ABC system makes many overheads a direct cost again. This helps in pricing decisions, and shows unnecessary options. For instance, DMA offers free office space and hardware. It is reasonable of DMA to demand a discount.
- Decision influencing: Each overhead cost has a more specific purpose now. It is harder for Elena or her PhD student to misappropriate funds.

SOLUTION 4 (APPROX. 20 MINUTES)

Is the norm catalogue a transfer pricing system? The norm catalogue seems to be a device for budgeting along the dean's guidelines. Alternatively, it can be seen as a transfer pricing system (TPS). Professors resemble units who provide education (teaching, grading, supervision). KBS has other units who can receive these services (Bachelor, Master, and PhD programs), and they pay the professors in hours, the norm being 900 hours a year. Professors are relatively free to choose to whom they provide their services. Leaving intrinsic motivation aside, they will have a tendency to provide services for which they can charge relatively more hours than the education activity takes them in real life. Since Elena points out that professors work overtime, all education activities may be underpaid in terms of chargeable hours; yet, professors would still pick the ones that are least underpaid.

Features of the TPS: Students should explain that transfer prices may generally originate from four different sources. According to the case description, the norm catalogue is not *market-based* as there is no price for the hours involved, nor is there an outside offer for the teaching hours considered. The absence of data also speaks against *cost-based* prices, since no one has measured if the teaching activity actually takes the budgeted amount of time. The transfer prices are not *administered* since there was a meeting where everyone compromised. Hence, the transfer prices are rather *negotiated*.

Effectiveness: Students may use four criteria to judge the effectiveness of TPS:

- **Autonomy** (YES): Despite the dean's guideline for allocating teaching activities, professors are relatively free to choose which content they would like to contribute to which program. Thereby, the TPS preserves the autonomy of the units well.
- Market-clearing **allocation** (NO): The professors are able to allocate their 900 hours of education to the units' programs, even to a degree that creates overtime. At the same time, the dean highlights that the PhD students are not able to allocate their education hours, and that some programs (the PhD program) complain about low supply. Assuming that there is a general match between the hours required by educational programs and the available hours to teachers, it appears that some educational activities are overpriced (they give too many hours compared to the actual effort), while others are underpriced. Thus, the TPS does not have a good allocation function.
- Goal **congruence** (NO): the dean is concerned that the current teaching choices of the professors run counter to the strategic goals that the university has set. He gives the example of missing PhD courses. This should be evidence enough that the TPS is not goal congruent in its current form.
- Reflect unit **performance** (PARTLY): The TPS indicates if professors can allocate their budgeted 900 hours of teaching per year, while the PhD students cannot. This result does not reflect the input PhD students might have put into preparing their offerings for teaching that they could not deliver. In addition, automated grading has led to the use of much multiple choice, while professors who conduct lengthy oral examinations of complex essay questions are not rewarded for their extra effort. The system thereby reflects performance only partly.

SOLUTION 5 (APPROX. 20 MINUTES)

From their previous analysis, students should conclude that the TPS does not fulfil all of its four listed purposes. Students should elaborate on two initiatives that could improve the situation. The initiatives should relate to transfer pricing, even though there appear to be multiple issues that would need consideration. Examples may include:

- Autonomy: The TPS is limited by the guideline of the dean who suggests that professors should spend 60% of their teaching in the Bachelor programs. Given that the PhD students can only teach there, and the supply of teaching by professors is seen as too high by the dean, the guideline should be revised to reflect the strategy of KBS, and within these boundaries, not restrict the TPS.
- Allocation: Some educational activities are underpriced. For instance, the norm system pays zero hours for teaching a PhD course or to second supervisors of theses, which should explain the low supply. On the other hand, the description of a Bachelor thesis supervision indicates that this is a relatively easy activity to perform compared to supervising and grading a Master thesis. Still, the activities pay almost the same (20+10 vs. 24+10 hours). Professors should renegotiate the catalogue amongst themselves until they feel that every hour paid is worth, on average, the same effort.
- Congruence: To reflect KBS' strategy, the TPS could introduce mandatory minimum quota of teaching in the PhD program, or allocate more hours to teaching PhD courses (e.g., 8 hours instead of 4 per unit).
- Performance: To reflect individual performance better, educational activities would need to be more differentiated in terms of chargeable hours. For instance, it takes much longer to grade a PhD thesis than a Bachelor thesis, but both pay 10 hours. Likewise, automated grading of multiple choice questions

requires less effort that grading essays, case studies, presentations or other innovative examination forms. The norm system should reflect these differences.

SOLUTION 6 (APPROX. 5 MINUTES)

Elena would expect to receive 80 EUR x 8 x 1.1= 704 EUR.

SOLUTION 7 (APPROX. 10 MINUTES)

Students need to realize that the opportunity cost involves 4 extra days of preparation and follow ups that Elena does not have as a consultant. Her opportunity cost for teaching 1 day at KBS is therefore 5,000 EUR (=1,000 EUR min. daily rate x [1 day of teaching + 4 extra days]). Since the teaching day has 8 hours, Dean would have to offer her a rate of 625 EUR to make Elena economically indifferent (= 5,000 EUR / 8 hours).

SOLUTION 8 (APPROX. 20 MINUTES)

Overall, the bonus system is not very effective. Students should raise three concerns, for example:

- Effect size: The bonus system must be economically substantial, irrespective how well calibrated it is or how much research findings are integrated. Elena can earn at least seven times the money working as a freelance consultant. In addition to the payment, she might enjoy consulting more. The text states that she is highly appreciated in practice, but executive students tend to be rather demanding.
- Chosen controls: Elena is an international expert in her field. This makes it difficult for both Dean and the students to assess the outcome of her teaching (maybe it is appropriate that some participants fail), as well as the cause and effects of her actions (maybe the most entertaining lectures are not the most informative). The control that ensures an impactful course is to look into Elenas credentials (education, prizes, publication), which constitutes an *input control*. The incentive system, however, measures *output controls* (student evaluation; failure rate). There is a mismatch of what KBS wants to reward, and what this system does reward.
- Non-financial key performance indicators (KPIs): Generally, it is recommended to use non-financial KPIs since they can predict future performance. In this incentive system, it is not clear if the KPIs are only backwards-oriented. For instance, Dean needs to make sure that the course evaluations ask participants about how they think they can apply their new skills at the job.
- Trade-offs: KPIs are supposed to have some trade-offs, so they can offer a balanced picture of Elena's performance. The trade-off is visible between liking the lecture and going outside one's comfort zone to pass the exam. However, the KPIs are per se not very helpful (see chosen controls).
- Strategic dysfunctionality: Dean should check if high performance in the KPIs aligns with KBS' strategic goals. It is, of course, the objective of Elena to prepare students so well for the exam that they do not fail. But some might choose not prepare. It is at least questionable to reward her (who is also the assessor of the exam) for low failing rates. If gaming this indicator becomes a structural problem at KBS, KBS' good reputation might suffer, leading to a loss of excellent staff and lower intake of brilliant students.

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