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# LET'S COLLABORATE, BUT I WILL BE THE FIRST AUTHOR! EXPLORING THE IMPORTANCE OF THE FIRST AUTHORSHIP FOR IS RESEARCHERS

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# LET'S COLLABORATE, BUT I WILL BE THE FIRST AUTHOR! EXPLORING THE IMPORTANCE OF THE FIRST AUTHORSHIP FOR IS RESEARCHERS

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## Abstract

*Collaboration among researchers is typically seen as the quintessence of academic excellence, leading to improvements in the research quality, capitalization on the diversity of perspectives and gains in productivity. Despite these benefits, many research teams find themselves torn by competition, antagonism and resentment. Desire to be the first author and resultant underperformance of non-first co-authors is often at the root of these conflicts. At the same time little is known about what motivates researchers in general and IS researchers in particular to engage as first authors. To fill this gap, this study uses survey methodology to explore the attitudes of IS researchers and their resulting behavior when it comes to authors order. Qualitative and quantitative evidence collected from 398 IS researchers is used to support our analysis. We find that researchers' desire to be the first authors is mainly driven by such determinants as career aspirations, visibility, leadership and sense of ownership, and less so by the desire to satisfy their self-esteem and self-actualization needs. In addition, the value placed on being the first author appears to be the function of researchers' career level, with Ph.D. students attaching significantly higher value to it than senior scholars.*

*Keywords: First Authorship, Publication Strategy, Information Systems, Incentives, Underperformance.*

# 1 Study Motivation

*“There is no limit to what a man can do so long as he does not care a straw who gets the credit for it.”  
Montague (1922, p. 216)*

Having roots in both computer science and business-related disciplines, Information Systems (IS) belong to the cohort of “data”-driven sciences, which heavily rely on research collaboration (Over and Smallman, 1973). Our exploratory analysis of ICIS proceedings provides strong evidence for the importance of teamwork in the IS discipline. Specifically, the share of single-authored publications remained low over the years reaching a mere 10.2% in 2009. At the same time, the share of publications with two and three authors comprised 38.5 and 33.2% in that year respectively. Taking a longitudinal perspective, the share of publications with multiple authors approached 85% between 1994 and 2009 (AIS Electronic Library, 2011). In addition to the data-driven nature of the research subject, these rates of cooperation could be also driven by the explosion in IT-enabled collaboration tools, which technology affine IS scholars - are more likely (than not) to use as early adopters (Moore and Griffin 2006). Considering the prevalence and the importance of collaboration in IS research, it is important to study the dynamics of this phenomenon particularly for this field of research.

Despite its obvious value, collaboration is a double-edged sword. On the one hand, it has been shown to improve research quality, lead to the diversity of perspectives and gains in productivity (e.g. Strahan, 1982; Moore and Griffin, 2006). On the other hand, many research teams find themselves torn by competition, antagonism and resentment (Erlen et al., 1997). Desire to be the first author is often at the root of these conflicts (Floyd et al., 1994). And there are good reasons for that. Being the first author on a publication leads to higher recognition and credit, which over time may translate to better chances of getting research grants, employment, merit-based salary raises, promotion, and tenure (Fine and Kurdek, 1993; Erlen et al., 1997). Reinforcing the desire to be the first author, some universities routinely apply differential weighting schemes for authorship when assessing candidates for employment (Moore and Griffin, 2006). These advantages inevitably lead researchers to associate significant value with being listed first and, therefore, choose non-alphabetical ordering so as to reflect the contribution of each author. Indeed, based on our review of the last 16 years 42.6% of two-author, 68.4% of three-author and 75.1% of four-author ICIS publications were explicitly ordered non-alphabetically (AIS Electronic Library, 2011). Moreover, we expect these numbers to be significantly underestimated since in many cases alphabetical ordering can be due to chance.

Reinforced by existing incentives, desire to be listed first appears to be so strong that in situations where alphabetical listing *is* a mandatory requirement, researchers with last names starting with P-Z choose not to engage in collaborative research (Over and Smallman, 1970). Beyond just avoiding collaboration, researchers might tend to free-ride and underperform on papers where they were not listed first while prioritizing their own papers instead (Hollis, 2008; Sokol, 2008). This behaviour inevitably creates tension between the co-authors, has a ruining effect on collaboration and inevitably jeopardizes the research quality. Despite these negative outcomes, little is known about the IS researchers’ attitudes and resulting behaviour when it comes to this “taboo” topic. To explore perceptions of IS academics on this issue, we developed a survey and collected responses from 398 IS researchers. Building on the results of the survey this paper investigates the motivations to be the first author and discusses the consequences of the first authorship pursuit. From the IS community perspective, this study represents the first attempt to stimulate the dialog on this controversial topic. By helping researchers understand the motives of others, our study seeks to promote conflict-free and productive collaborations.

## 2 Theoretical Background

While justifications for including authors on a publication are well-covered in the guidelines of some IS journals and associations (e.g. AIS, 2003), little insight is provided into how the positions of the authors should be determined. Rooted in fairness perceptions, a non-alphabetical ordering is often used to reflect the contribution of each co-author (Moore and Griffin, 2006). This approach, however, has many caveats as the authors may assess their contribution differently which can lead to conflicts (Ilakovac et al., 2007). Despite these drawbacks, contribution-based non-alphabetical ordering is often seen as a superior choice as it “rewards” the first author, who is perceived to contribute the most. Indeed, it is often expected that the first author assumes responsibility over the whole project, sets deadlines, directs research and guides others (Erlen et al. 1997; Moore and Griffin, 2006). However, while this type of ordering reflects the common practice, it does not answer the question of *why* a researcher would choose to contribute the most to ensure the first position on a paper.

One general motive identified in literature includes *career aspirations* as the first authorship is often used as a criterion for promotion, tenure, and salary decisions (Costa and Gatz, 1992). Investigating the context of medical sciences, Walker et al. (2010) find that being the first author influences 75.9% of all related annual performance review and assessment processes. Moreover, even in situations where author names are expressly ordered alphabetically, as is the case for economics, Einav and Yariv (2006, p.175) find a positive correlation between surname initials (the earlier in the alphabet the better) and such desirable outcomes as “*tenure at highly ranked schools, fellowship in the Econometric Society, and to a lesser extent, Nobel Prize and Clark Medal winnings*”. Another explanation for the importance of the first authorship lies in the *visibility* the first authors enjoy. This can be traced back to the widespread practice of substituting co-authors names with “et al.” abbreviation. As a result, the first authors have a greater chance of being associated with the research they are involved in (Over and Smallman, 1973). Beyond enhancing their visibility in the community, first authors are also more likely to enjoy recognition and respect from their peers (Over and Smallman, 1973). This deserved recognition of one’s competences promotes feelings of self-worth and, thereby, helps to satisfy one’s *self-esteem needs* (Maslow, 1954). Beyond extrinsic incentives of a better career, visibility and self-esteem, desire to be the first author can also be motivated intrinsically. For example, researchers may develop proprietary attitudes towards their ideas and, therefore, place high value on being listed first to signal and claim their “*ownership*” (Moore and Griffin, 2006; Schrodt et al., 2003). Finally, importance attached to the first authorship is found to be a function of researchers’ career level, with senior scholars preferring the “mentor” role and, therefore, choosing to be listed behind their junior collaborators (Fine and Kurdek, 1993). Taken together, however, current research offers only limited insights into the incentives of being listed first.

## 3 Research Approach

### 3.1 Pre-study

Considering the scarcity of literature addressing the issue of the first authorship, seven semi-structured interviews were conducted with the IS researchers (4 Ph.D. students, 2 post-docs and 1 junior professor). The sole purpose of these interviews was to gain preliminary insights into the individual incentives to be listed first. Consistent with previous research, (1) career aspirations, (2) visibility in the community, (3) desire to gain recognition and thereby boost one’s self-esteem and (4) ownership motives emerged as salient factors. For example, emphasizing the pursuit for recognition and ownership motives one interviewee noted: “*I can only boast about the paper when I am listed first. Otherwise people think it is not my contribution. Then why do I take the credit?*” Interestingly, some respondents believed that the use of the results by non-first co-authors was even unethical: “*How can she present my results? It was me who did most work...*” In addition, desire to satisfy one’s (5) self-actualisation needs, defined as “*the desire to become more and more what one is, to become everything that one is capable of becoming*” (Maslow, 1954, p. 92) was identified as another powerful

motivator. Specifically, respondents perceived research leadership as the means to self-fulfil and realize their potential: “*When I submit a paper where I am the first author I feel I have achieved something by myself.*” This is consistent with Maslow’s (1954) theory of human motivation that argues that self-esteem and self-actualization needs represent powerful drivers of human behaviour. Taken together, analysis of our interviews helped us to tentatively verify the applicability of factors identified in the previous research: career aspirations, professional visibility, self-esteem and sense of ownership. In addition, self-actualization was singled out as another possible motivation. As the interviews were conducted only with junior members of one IS Institute, the gained insights were only preliminary and needed further validation and refinement with a larger sample as was done in the next step.

### 3.2 Instrument development, data collection and sampling

To gain a deeper understanding of the ‘first authorship’ phenomenon and its consequences for collaboration, a survey instrument was developed. Following previous research as well as the results of our exploratory interviews, five factors aimed at capturing anticipated consequences of being the first author and, therefore, interpreted as motives were operationalized as multi-item constructs measured on a 7-point Likert scale (Vroom, 1964). While we tried to rely on the pre-tested scales where possible, the scarcity of the empirical studies for the studied context lead us to significantly modify the items or develop them anew. Once developed, the survey instrument was pretested with 10 IS researchers to ensure validity of our measurement. Table 1 provides final items used in this study. In addition, open-ended questions about the importance attached to the first authorship and the reasons behind these attitudes were asked. The survey also included a variety of questions to capture the consequences of the “first author” pursuit as presented in the following chapters.

Construct (Source)	Items
	<i>Only when I am the first author on a publication:</i>
Career Aspirations (self-developed)	<i>... this paper will be accounted for in my publication record when I apply for an academic position; ...I will be given credit for this paper when I apply for a job in academia; ...this paper will bring me closer to my career goals (promotion, salary raise, etc.);</i>
Sense of Ownership (self-developed)	<i>...I am entitled to refer to this paper as "mine" when I talk to others; ...I have a sense that this is "my" work; ...I think of this paper as my own.</i>
Visibility (self-developed)	<i>...I get visibility for my contribution to this paper; ...others will associate me with this paper; ...others will notice my name on this paper.</i>
Self-esteem (Schneider and Alderfer 1973)	<i>...I feel I am capable of doing good research; ...I feel I am a worthy researcher; ...I feel I am able to do research as well as others; ...others will respect me for my contribution to this paper.</i>
Self-actualization (Schneider and Alderfer 1973)	<i>...I have achieved something; ...I have a sense of accomplishment; ...I get a feeling of self-fulfilment; ...I feel I am realizing my potential.</i>

Table 1. Construct operationalization.

An invitation to participate in the survey was sent twice to AISWorld mailing list (<http://www.aisworld.org/>) under the title “*How Do Researchers in Information Systems Collaborate?*”. In addition, the publicly available emails of researchers who published in ECIS 2008, 2009, 2011, WI 2011 and ICIS 2009, 2010 Proceedings were collected from AIS Electronic Library (2011) and used for contact. In total, 398 IS researchers from 48 countries answered the survey between September and November 2011. 41.9% of the respondents were Ph.D. students, 25.6% were junior researchers: post-doctoral fellows, assistant and junior professors and 32.5% were associate (or full) professors. Geographically, 59.5% of respondents had their workplace in Europe, 24.9% in North America and 15.6% in other regions including Asia, Australia and Pacific, Middle East & Africa and South America. 69.3% of the respondents were male and 30.7% were female. The mean age of the respondents was 38.7 (SD 11.36).

### 3.3 Results

#### 3.3.1 Qualitative analysis: motivation to be the first author

To get additional and more profound insights into researchers' motivations for being the first author, the following open-ended question was asked: "*Some researchers place a high value on being the first author. How important is it for you? Why?*" In total, 245 participants gave a clear statement concerning the *importance* of being the first author in response to this question. To ease interpretability, we categorized all answers on a 5-point scale: 1=not important, 2=slightly important, 3= partially important (in some cases important, in some cases not), 4=important, and 5=very important. For example, the answers like "no", "not at all", "does not matter" were assigned to the "1=not important" category. Overall, only 17.0% of the respondents claimed that the order is not important for them. 44.4% of the respondents acknowledged that being the first author is slightly or partially important for them. 38.6% stated that being the first author is important or very important. In line with the previous research (e.g. Fine and Kurdek, 1993), our analysis shows that the importance attached to being the first author is a function of the career stage as shown by Kruskal-Wallis ANOVA test ( $p < .001$ ): While the mean for Ph.D. students reaches the highest 3.56 (SD = 1.43), for post-doctoral fellow / assistant professors it equals 3.35 (1.36) and for associate professor/ full professors it is the lowest at 2.48 (1.29).

225 respondents provided an extended explanation for the reasons behind the importance (or lack thereof) they attach to being the first author, resulting in a total of 11,850 words available for analysis. The content analysis was used to identify and classify researchers' responses into codebook categories as recommended by Ryan and Bernard (2000). While analysis was exploratory in nature we also relied on the theoretical and qualitative insights described above when interpreting our textual data. As a result, seven reasons why being the first author is important and six reasons why it is not were identified as shown in Table 2. In the next step, two authors independently assigned 327 keywords into the codebook categories. Inter-coder reliability constituted 0.861 ( $p < .000$ ) suggesting a high level of agreement (Landis and Koch, 1977). In the final step, both coders discussed the keywords for which the disagreement occurred. The final decision was reached by consensus. This resulting categorization was then used to determine the absolute and relative frequencies of the keyword occurrence and the number of respondents bringing up a particular theme. Summarized in Table 2 these metrics can be interpreted as proxies for the salience of the respective motives.

Our analysis shows that the largest portion of academics (33.3%) believes that it is fair when the order reflects the contribution of the researchers involved. Hence, they expect to be listed first when they did the largest share of the work. At the same time, respondents admit that contribution-based ordering "*... causes more friction in working collaboratively on research ideas*". Despite importance of fairness, 5 respondents reported to have no influence on the order as the first position is reserved for senior researchers or authors are always ordered alphabetically. While fairness motives typically played a role once the paper was finished, six distinct motives spurred researchers' desire to engage as the first author from the start. Specifically, 42 respondents believed that being the first author helps them to achieve their career goals. In this respect, institutional requirements were often mentioned by Ph.D. students and non-tenured academics: "*it is very important for me [...] to increase my chances of doing my PhD at a good university.*" At the same time, associate professors admitted to place less emphasis on the first authorship as they had no further career ambitions (6.7%). Instead, they viewed their role more of a mentor of a younger generation (12.0%). 33 respondents believed that the first author receives more visibility than other co-authors: "*... if the paper is done by more than two only the first name is known*". 14 and 4 of the respondents acknowledged that being the first author helps them to satisfy their needs for self-esteem and self-actualization respectively: "*I get high levels of satisfaction and confidence only when I'm the first author.*" 20 respondents indicated that the first author has more claims on the results presented in the publication and thereby "owns" it. This was particularly true when the idea for the publication also came from the first author. Finally, the desire for leadership emerged as another powerful motivator to act as the first author for 33 respondents in our sample:

*“You get the lead on the publication and can rule into the direction you like when you are the first author.”*

Category	Description	Quote Example	absolute/ relative frequency (no. of respondents)
<b>Why first authorship is important:</b>			
Fairness / Contribution	Being the first author is important and fair as it reflects the contribution	<i>“My only concern is that the order is fair: if I make the largest contribution I expect to be the first author.”</i>	79 / 24.2% (75 / 33.3%)
Career Aspirations / Institutional Requirements	Being the first author is important for career advancement and is part of promotion requirements	<i>“It was important before I got my tenured full professor position.”</i>	45 / 13.8% (42 / 18.7%)
Visibility	Being the first author improves visibility in the community. The first author is associated with the research	<i>“If there are three or more authors then only the first author name is noted in the text [...] there is a tendency for the first author to be remembered.”</i>	35 / 10.7% (33 / 14.7%)
Leadership	Being the first author allows to direct the research and demonstrate leadership skills	<i>“My own problem is that I am too much an alpha male. I tend to dominate and take charge.”</i>	34 / 10.4% (33 / 14.7%)
Sense of Ownership	The first author is regarded as the owner of the paper and can use it to self-promote oneself	<i>“It means it is my baby, my idea, my work.”</i>	20 / 6.1% (20 / 8.9%)
Self-esteem	Being the first author results in recognition and improves self-esteem	<i>“Being first author is important since [...] it displays my abilities as a researcher.”</i>	15 / 4.7% (14 / 6.2%)
Self-actualization	Being the first author leads to the feelings of self-fulfilment, self-accomplishment, helps to realize one’s abilities	<i>“...having the feeling that you've accomplished something”</i>	4 / 1.2% (4 / 1.8%)
<b>Why first authorship is not important:</b>			
Mentor Role	It is more important to support younger colleagues or students than being the first author	<i>“As a senior researcher my role is to facilitate the development and research of others [...] and it’s more important for them to get the “boost” from being first author than for me.”</i>	27 / 8.3% (27 / 12.0%)
Teamwork	Accomplishing defined goals together is more important than the authors’ order	<i>“Being a co-author farther down the chain indicates I can work well with others who lead.”</i>	26 / 8.0% (25 / 11.1%)
Interest in Research	Research is driven by interest and desire to find out something new	<i>“Working on an interesting project [...] is much more worth than being a first author”</i>	8 / 2.4% (8 / 3.6%)
Learning	Researchers may choose to collaborate to learn something new from their (senior) colleagues (e.g. methodology)	<i>“My current goal is to learn from more experienced colleagues and gain experience. I reckon, once I become a good researcher the ambition to be the first author would increase.”</i>	4 / 1.2% (4 / 1.8%)
No further career ambitions	Being the first author is not important once a certain career point has been reached	<i>“As I am a tenured full professor in a good university it is not important anymore for me to achieve higher career ambitions.”</i>	15 / 4.6% (15 / 6.7%)
No Choice	No option to be first author due to the department policy, rules or established traditions	<i>“The rule is always that the head of the chair is the first author.”</i>	5 / 1.5% (5 / 2.2%)

	(e.g. hierarchy-based, alphabetical order)	
<b>Why first authorship is or is not important</b> (other reasons of lesser importance):		
Other	Conflict-avoidance, institutional culture, search for grants, workplace conditions, no colleagues, focus on single-authored publications.	11 / 3.4% (11 / 4.9%)

Table 2. Coding categories and content analysis results

Contrasting the desire to lead and dominate others, 25 respondents claimed that teamwork plays a key role in research and, therefore, deemphasized the importance of the first authorship: "...*authorship disagreements tend to be very counterproductive and I try to avoid those fights whenever possible*". Beyond causing disagreements, accent on the first authorship was also likely to lead to free-riding and underperformance of others as reported by our respondents: "...*being a second or third author also means you don't have to do most of the work.*" Interestingly, only few researchers mentioned that being the first author is not that important for them as their primary research motivation is interest (8 respondents) and desire to learn something new (4 respondents).

Together, the insights discussed above expose an array of factors behind the first authorship phenomenon. It appears that researchers' desire to be the first authors is mainly driven by such determinants as career aspirations, visibility, leadership and sense of ownership, and less so by the desire to satisfy their self-esteem and self-actualization needs. As the leadership factor only emerged at this stage of our analysis we were not able to integrate it into our quantitative study. At the same time, we note that the desire to lead is often personality-related and, hence, cannot be adjusted externally or via better alignment of research incentives – the ultimate goal our study pursues (Coupé, Smeets and Warzynski, 2006; Mangematin, 2000)

### 3.3.2 Quantitative analysis: motivation to be the first author

To gain a deeper insight into IS researchers' beliefs about the value of being listed first, the answers to the close-ended questions (see Table 1) operationalizing career aspirations, sense of ownership, visibility, self-esteem and self-actualization needs were analysed. Expressing anticipated consequences of being the first author, these beliefs should be interpreted as motives to engage as the first author (Vroom, 1964). Considering that the scales had to be modified or developed anew, a principal component analysis with direct oblimin rotation was performed on the collected data using SPSS 19.0 to ensure that the expected category structure was also reflected in the extracted factor groups. By examining the multitrait-multimethod matrix, four components were extracted, with "self-esteem" and "self-actualization" loading into the same component, which we subsequently refer to as "self-accomplishment" and use as one construct in our further analysis. It appears that being the first author is equally associated with the satisfaction of those two types of needs. All other components corresponded to the constructs they were supposed to measure. The resulting measurement scales exhibit very high reliability, with Cronbach's alpha (CA) values exceeding .90 (see Table 3).

A closer look at the scale means summarized in Table 3 reveals that respondents particularly perceived enhancement in visibility (mean=4.46) as the consequence of being listed first. In fact, over a third of the respondents (39.3%) agreed or strongly agreed that *others will associate them with the paper only when they are listed first*. The visibility motive was closely followed by expectations of career promotions (mean=3.99) with 47.6% of IS researchers in our sample being slightly or more convinced that a particular publication only then helps to *improve their career prospects* when they are the first author on it. Moreover, 10.5% of respondents strongly agreed that *only being the first author they get credit for a paper when applying for an academic position*. Interestingly, 33.7% at least slightly agreed with the statement that *only when they are the first authors they are entitled to refer to the paper as mine when talking to others*, which signals the presence of strong "ownership" motives for some IS researchers in our sample. Nevertheless, 44.4% of researchers rejected this view. Finally, 32% of the respondents at least slightly agree to *have a feeling of having achieved something when acting as first authors*, with 6.4% expressing strong agreement with this statement. At the same time



46.3% strongly disagreed with this statement, signalling high heterogeneity in the perceptions among respondents.

Construct	Construct Mean	SD	Factor loadings	CA	Construct Means by Category		
					Ph.D. students	Junior Researchers	Associate Professors
Career Aspirations	3.99	1.75	.88 - .91	.92	4.51***	3.80***	3.52***
Sense of Ownership	3.56	1.81	.89 - .92	.91	4.05***	3.26***	3.15***
Visibility	4.46	1.68	.93 - .95	.92	4.87***	4.49***	3.96***
Self- accomplishment	3.24	1.65	.77 - .93	.96	3.77***	3.08***	2.71***

Table 3. Construct statistics and mean differences between academic levels ( $p^{***} < .001$ ).

Overall, our analysis reveals that, while researchers in the IS field are well aware of the advantages of being listed first, their attitudes vary greatly. These differences can be a function of their career stage as suggested by previous research (Fine and Kurdek, 1993). To explore these differences we conducted non-parametric Kruskal-Wallis ANOVA tests that revealed significant mean differences in the expected consequences of the first authorship between three academic levels as shown in Table 3. Apparently, Ph.D. students associate first authorship with much greater gains than researchers at other levels. At the same time, Associate Professors express the highest scepticism regarding the potential benefits of the first authorship. Interestingly, testing for differences across male and female researchers as well as three workplace regions (Europe, North America, Other) revealed no significant differences between those groups.

To further explore the respondents' perceptions of the benefits of first authorship, a hierarchical agglomerative cluster analysis using Ward's linkage on the individual attitudes of 389 respondents - career aspirations, sense of ownership, visibility, self-accomplishment - was conducted to identify groups of researchers with similar perceptions and explore the group differences (Everitt et al., 2011). As a result of this procedure three independent clusters emerged.

Scale	Construct Means			p-values for standardized scales			
	Cluster 1 n=102	Cluster 2 n=154	Cluster 3 n=133	F-test	T-test Cluster 1/2	T-test Cluster 2/3	T-test Cluster 1/3
Career	5.73	3.95	2.75	.000	.000	.000	.000
Ownership	5.47	3.48	2.17	.019	.000	.000	.000
Visibility	5.97	5.04	2.64	.001	.000	.000	.000
Self-accomplishment	5.42	3.09	1.80	.142	.000	.000	.000

Table 4. First authorship evaluation across clusters.

Demographic Groups		Overall Sample, n=389, %	Cluster 1 "The Leaders"	Cluster 2 "Visibility pragmatists"	Cluster 3 "The Relaxed"
			% within cluster		
Academic level	Ph.D. student	41.9	54.1	44.8	27.0
	Junior Researchers	25.6	23.5	25.2	27.8
	Associate Professors	32.5	22.4	30.1	45.2
Gender	Male	69.3	72.5	64.3	72.9
	Female	30.7	27.5	35.7	27.1

Table 4 reports on the size of clusters, means for the first authorship motives constructs and the significance of differences between two cluster pairs established via t-tests on the standardized scales.

Table 5 provides a summary of the demographic characteristics of our clusters. We find that respondents in *cluster 1* associate the highest benefits with being the first author with means reaching 5.42 for self-accomplishment, 5.47 for ownership, 5.73 to career and 5.97 for visibility as shown in Table 4. These attitudes are also significantly stronger than in clusters 2 and 3 across all constructs we tested ( $p = .000$ ). Considering the magnitude of benefits these researchers attach to being the first author, we refer to this cluster as “*The Leaders*”. We find that Ph.D. students are overrepresented and associate professors are underrepresented in this cluster. In line with our qualitative findings, Ph.D. students often interpret the first authorship as the essential pre-requisite for completing their Ph.D. and future career success: “...important as it is looked upon when applying for grants but also if you want apply at other institutions.” Furthermore, finding themselves just in the beginning of their careers, Ph.D. students are naturally willing to prove their leadership skills and establish themselves as experts in a specific domain: “You start as a PhD student. At that stage, it is good to be a first author to demonstrate that you can lead and plan a project.” Interestingly, only 18% of associate professors in our sample associate significant benefits with being listed first and fall into this cluster. The reason behind these beliefs may possibly lie in the absence of other mechanisms to communicate one’s performance to the outside world: “My work with Ph.D. students presents a dilemma. If the work is related to their dissertation [...], they will be first author. [...] As a result, someone looking at my vita may not understand the level of intellectual contribution I have made on these papers. [...] If I add in the hours spent as an Associate Editor [...], much of my research contribution is invisible.

Researchers in *cluster 2* have a largely neutral position with regard to career, ownership and self-accomplishment gains. At the same time, they associate first authorship with significant improvements in visibility. Considering that gains in visibility comprise one of the least disputable outcomes of being listed first (due to common citation styles), we refer to this group as “*Visibility pragmatists*”. No demographic group noticeably dominates this cluster, signalling that perceptions of visibility gains are equally spread among researchers at all levels. For example, explicating the reasons for the importance of being first, one Ph.D. respondent noted: “Very important because I need it to show that I can do research. At least for now, at the beginning of my career”. In a similar vein, a post-doctoral researcher commented: “Rather important because I will get “credit” for this publication in the community and will be mentioned when the article is referenced in other research studies”. In contrast to cluster 1, *cluster 3* exhibits the lowest means for all four constructs we tested. Members of this cluster disagree that only first authors can derive significant benefits from the publications they participate in. Apparently, researchers in this cluster do not perceive first authorship to be that important. Considering these distinguishing characteristics, we call this cluster “*The Relaxed*”. Associate Professors are overrepresented in this cluster as shown in Table 5. It appears that once career is established, other priorities emerge: “It is more important that my colleague and students get recognition. I have all the recognition I need. I am still active but have nothing to prove.” 37.2% of all post-docs, assistant and junior professors in our sample fell into this cluster as well. This sub-group felt that *not* being the first author can be important too as it signals mentoring abilities: “as a Post Doc you supervise PhD students [...]. If I am a second author, then, I still know that the paper would not have succeeded without my contribution, both directly put into the paper and even more due to the supervision and mentoring”. Despite being underrepresented as a group in this cluster, 22.5% of Ph.D. students in our sample belong to cluster 3. These students often did not have the first authorship as part of their Ph.D. requirement: “Not so important, because the points I get for publications only slightly differ depending on the position of the author.” Instead, they focused on learning the tools of the trade and were happy to be working with more experienced scholars: “I am happy to be 3rd or 4th when working with someone I can learn from even if I do most of the work”.

Looking across clusters, we find that the issue of first authorship is mainly relevant for Ph.D. students and drops as the academic level increases. While Ph.D. students strive to establish themselves in the community and boost their careers, senior researchers place greater value on teamwork and mentoring. Finally, motivations behind first authorship are not contingent on gender or geographical region as no noticeable differences could be found.

### 3.3.3 Consequences of the emphasis on the first authorship

Analysis of our qualitative data and past research (e.g. Floyd et al., 1994) has shown that conflicts and underperformance of non-first authors are common consequences of the over-emphasis on the first authorship. To explore these problematic issues a set of questions were included into our survey. We find that 30.7% of the respondents confessed to have at least sometimes experienced tension with other co-authors regarding “who will be the first author”. Moreover, 8.9% acknowledged to experience tension about “the order of the authors” often, very often or every time as summarized in Table 6.

In the past how often did you experience tension with co-authors regarding:							
	Every time	Very often	Often	Sometimes	Rarely	Very Rarely	Never
...the order of the authors	0.5%	2.3%	6.1%	25.8%	20.0%	23.3%	22.0%
...who will be the first author	0.8%	2.5%	5.3%	22.1%	20.4%	21.6%	27.2%
...the content of the paper	2.8%	6.3%	18.2%	31.6%	20.8%	11.1%	9.1%
...under-performance of other co-authors	2.0%	6.9%	16.5%	31.2%	18.5%	13.5%	11.4%

Table 6. Causes of tension among co-authors (n=398).

As researchers are placing such a high value on being the first author, the role and contribution expectations of the other authors are likely to diminish. Indeed, if being the second or third author is not appreciated, why strain on such publications? Assuming that researchers are rational agents, it is plausible to hypothesize that non-first authors will invest the minimum amount of effort necessary to “lock-in” their authorship, leaving the lions’ share of work to the first author. As a result of this behavior, the overall quality of research is likely to suffer (Floyd et al., 1994; Moore and Griffin, 2006). To explore whether this really takes place we asked our respondents to indicate the share of time the first, second and third authors *typically* invest on a three-author publication. Responses to these questions were contrasted with the shares of the workload respondents hold to be *fair* to invest (see Table 7). Considering that respondents were reporting from their own personal experience, it is plausible to assume that responses to the “typical” workload questions reflect the actual practices researchers themselves adopted.

Consider a paper with 3 co-authors, in which authors are not ordered alphabetically. What share of time (in %):	... will it be <b>fair</b> for each author to invest into it? (n=365)					...do people <b>typically</b> invest when writing such paper? (n=347)				
	Mean	SD	Median	Min	Max	Mean	SD	Median	Min	Max
1st Author	51.0	8.6	<b>50.0</b>	33.0	85.0	57.3	16.8	<b>60.0</b>	0.0	100.0
2nd Author	28.7	4.6	<b>30.0</b>	10.0	40.0	26.4	10.2	<b>30.0</b>	0.0	80.0
3rd Author	20.2	6.0	<b>20.0</b>	5.0	33.3	16.5	10.5	<b>15.0</b>	0.0	70.0

Table 7. Fair and typical workload distribution among authors.

Already at this aggregated level, we observe notable differences in the expected and typical performance levels. Our results suggest that first authors work more than what is considered fair ( $p < 0.000$ ): 60% vs. 50% (median). At the same time, when working as *second* or *third* authors, researchers typically invest less time than what is fair ( $p < 0.000$ ): e.g. 15% vs. 20% for third authors (median). Nonetheless, a closer look at our data reveals that respondents differed significantly in their views regarding the gap between the fair and typical shares of work authors invest. For example, 22.8% saw no differences between the fair and typical work contribution of the first author and 23.3% stated that the first author was actually underperforming in comparison to what was fair. Nonetheless, a whopping 53.9% of the respondents were convinced that typically the first author does more work

than what she should be doing. Moreover, almost one fifth of these researchers claimed that the gap between typical and fair share of contribution was 25% or more, with the highest “overperformance” gap reaching 67%. When it comes to non-first authors, the views varied as well. Specifically, 20.5% of the respondents perceived the third author to contribute more than expected, and 25.1% saw no difference in performance. At the same time a remarkable 54.5% “accused” third authors of free-riding: Among them 27% claimed that the gap between typical and fair performance was as high as 15% or more.

To better understand the underlying dynamics behind researchers’ fairness perceptions, a correlation analysis between stated shares of fair workload and identified motives to be the first author was conducted. Among four motives we tested, only *sense of ownership* is significantly correlated and, therefore, can be viewed as a motivator to rationalize higher contribution of the first author ( $r=0.137$ ,  $p=0.009$ ) and lower contribution of the second and third authors ( $r=-0.097$ ,  $p=0.066$ ;  $r=-0.119$ ,  $p=0.023$ ).

## 4 Concluding Remarks

This paper makes several contributions to our understanding of the first author motives of IS researchers and resulting tensions and issues impeding successful collaboration. First, we empirically examine the motives to be the first author and find that authors in IS field are primarily motivated by career aspirations, desire for visibility in the community, sense of ownership and less so by the need to boost self-esteem and attain self-fulfilment. Second, we find that the importance of first authorship is a function of the career level with more junior researchers, such as Ph.D. students, being most eager to see their names first on the paper. By doing so, they seek to prove themselves, showcase their work, build their reputation and, thereby, improve their employment prospects. As the career gets established, the desire to be first becomes less salient. Instead, senior researchers concentrate on the pursuit of intriguing topics while nurturing collaborative and mentoring relationships. They see their role more as mentors to junior researchers, promoters and gatekeepers of their research community. They derive their satisfaction and self-actualization from respect they get from the community, success of their protégés and growth of their research discipline. Nonetheless, some of them recognize that much of their contribution regrettably stays invisible. Third, we find that researchers over-prioritize their ‘own’ papers while underperforming on others. Based on our findings non-first authors typically invest less time than what is considered to be fair. This inevitably leads to conflicts, and even co-author resentment. From a long-term perspective, such behaviour may have a detrimental impact on the quality of IS research as well as diminish life and job satisfaction: *“I just cannot stand these conflicts any more. I want to finish my Ph.D. and go to the industry”*. The ambiguity of signals sent by the hiring committees could be responsible for this skewness of incentives: *“It is very important to know what credit future employers give for first authors [...]. I will align my publication goals to future employers’ selection criteria. Publications have little value if they cannot help me to achieve my personal career goals”*. While recognizing importance and value of contribution-based author ranking, many researchers in our sample wished for less emphasis placed on the author order: *“As a Post Doc you supervise PhD students [...]. If I am a second author, then, I still know that the paper would not have succeeded without my contribution [...]. Therefore, qualities and capabilities of researchers should not be evaluated based on the position in the authors list.”* Furthermore, many of them expressed concern regarding the issue of “ghost” authors as they further complicate the assessment of others’ contribution to a paper: *“When our grad work is published, our supervisors take first author as a right - regardless of contribution”*. At the same time while IS journals guidelines and associations (e.g. AIS, 2003) often prescribe the rationale for including authors, the enforcement of these rules is largely non-existent. Finally, we contribute by developing scales to measure the anticipated benefits of being the first author. Future research could use our instrument to explore country specific and institutional differences in first authorship motives. Given that the overemphasis on the pursuit of first authorship could have a ruining effect on collaboration and quality of research, this intriguing and sensitive topic warrants further investigation and discussion.

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