

1 **Barriers and benefits to the adoption of a third party certified food**
2 **safety management system in the food processing sector in Shanghai,**
3 **China**

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12
13 **Abstract**

14
15 Despite the recent passing of legislation by the National People's Congress of China in
16 2009, many food businesses in China have yet to implement a third party certified food
17 safety management system (FSMS). While the extant literature identifies a number of
18 internal and external barriers and benefits, the extent to which these impact on the
19 business is thought to be dependent upon how much progress the firm has made on its
20 journey towards quality assurance and the environment within which the firm operates.
21 To test this proposition, the barriers and the benefits accrued from the implementation
22 of a third party certified FSMS were explored by segregating the participating firms into
23 three distinct groups; (i) those that have yet to implement a third party certified FSMS;
24 (ii) those that were in the process of adopting a third party certified FSMS; and (iii)
25 those that were already operating under a third party certified FSMS. Contrary to
26 expectations, in what is a highly competitive market, those firms which were operating
27 under a third party certified FSMS were more likely to question the benefits they had
28 derived than those firms that were either in the process of adoption or had chosen not to
29 adopt a third party certified FSMS. Irrespective of the stage of adoption, the major
30 constraint to the implementation of a third party certified FSMS was the need for the
31 organisation to focus on more immediate issues and the lack of any strategic long-term
32 planning.

33
34 **Keywords:** food safety, quality management

49 **Highlights**

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51 **Highlights**

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53 • benefits and barriers to the adoption of FSMS by three stages of adoption

54 • barriers become more apparent as the firm progresses towards quality assurance

55 • three latent constructs constrain the adoption of FSMS

56 • three benefits arise from the adoption of third party certified FSMS

57 • firms operating under a FSMS perceive themselves as being less competitive

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97 **Introduction**

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99 Food manufacturing in China continues to grow from strength to strength. In 2011, the
100 food manufacturing industry employed more than 6.7 million people to generate sales in
101 excess of RMB 6.9 trillion (GAIN, 2013). Expansion has been driven by the increasing
102 growth in personal disposable income, the demand for more convenient food and
103 greater urbanisation.

104

105 The food processing industry in China covers a multitude of sectors including meat,
106 poultry and dairy products, fruit and vegetables, confectionary and snack products,
107 cereals, oils and fats, beverages and seafood. While most food processors acknowledge
108 that some basic food safety and hygiene system is necessary to protect consumers and
109 their reputation, frequent reports of food adulteration continue to erode consumer
110 confidence in both domestic and international markets (Jia & Jukes, 2013; Lam et al.,
111 2013; Ortega et al., 2011; Tang & Babich, 2014; Yan, 2012). Although numerous
112 internationally recognised third party certified food safety management systems (FSMS)
113 including BRC, HACCP, IFS, ISO 22000 and QS are available to minimise the risk,
114 there is some evidence to suggest that the uptake of these systems is well below
115 expectations. Chu, Feng and Chen (2014) report that in 2013, only 12,520 food
116 companies were third party certified in China. However, as GAIN (2103) reveal, 92% of
117 the 400,000 plus food manufacturers are small to medium-sized enterprises, most of
118 whom lack any formal training in food safety management.

119

120 Within the literature, there is widespread recognition that the barriers and constraints to
121 the implementation of third party certified FSMS differ by the size of the firm
122 (Fotopoulos et al., 2011; Karipidis et al, 2009; Massoud et al., 2010; Taylor, 2001;
123 Trienekens & Zuurbier, 2008), by industry (Herath & Henson, 2010; Kuepper & Batt,
124 2012) and across countries (Bass et al., 2007; Dora et al., 2013; Maldonado-Siman et
125 al., 2014; Massoud et al., 2010). While the literature acknowledges differences in a
126 firm's motives for adopting a third party certified FSMS (Fotopoulos et al., 2011; Katri
127 & Collins, 2007; Massoud et al., 2001) and differences between those firms which
128 choose to implement a third party certified FSMS and those which do not (Ahire et al.,
129 1996; Jin et al., 2008; Salegna & Fazel, 2000), there is very little evidence in the
130 literature of any study that explores differences in the perceived barriers and benefits by
131 the stage of adoption.

132

133 Using Rogers (1995) diffusion of innovation theory, Fernando et al. (2014) endeavoured
134 to distinguish between innovators, early adopters, the early majority, late majority and
135 laggards. Jin et al. (2008) took a more simplistic approach by seeking to compare firms
136 that had a fully operational HACCP system and those that did not. While Herath and
137 Henson (2010) noted that 38% of their sample had a fully operational HACCP plan,
138 19% were in the process of implementation and 37% had no intentions of implementing
139 a HACCP based FSMS, they elected not to explore the different perceptions and
140 experiences by the stage of adoption. As reported by Karipidis et al. (2009) and
141 Kuepper and Batt (2012), the perceived benefits and barriers associated with the
142 implementation of a third party certified FSMS are observed to be different before and
143 after implementation.

144 To overcome these gaps in the literature, this study seeks to explore the perceived
145 barriers and benefits derived from the implementation of a third party certified FSMS in
146 the food processing sector in Shanghai, China, by grouping the firms into one of three
147 mutually exclusive groups: (i) those firms which have chosen not to adopt a third party
148 certified FSMS; (ii) those firms which are in the process of adopting a third party
149 certified FSMS; and (iii) those firms that are already operating under a third party
150 certified FSMS.

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152 **Benefits and barriers to the adoption of food safety management systems**

153

154 Firms implement third party certified FSMS because they are forced to, either by their
155 customers or public authorities, or voluntarily because they recognise that the benefits
156 outweigh the costs (Taylor, 2001; Karipidis et al., 2009). Within the quality literature,
157 the benefits most often associated with the implementation of a third party certified
158 FSMS include improved product quality and safety (Bai et al., 2007; Jin et al., 2008;
159 Macheke et al., 2013); reduced costs (Dora et al., 2013; Fotopoulos et al., 2011; Jin et
160 al., 2008; Katri & Collins, 2007; Massoud et al., 2010; Taylor, 2001); less waste
161 (Fotopoulos et al., 2011; Jin et al., 2008); access to new markets (Bai et al., 2007;
162 Fotopoulos et al., 2011, Jin et al., 2008; Macheke et al., 2013; Taylor 2001); increased
163 market share (Bai et al., 2007; Macheke et al., 2013); fewer customer complaints (Bas et
164 al., 2007; Dora et al., 2013; Fotopoulos et al., 2011); improved productivity (Dora et al.,
165 2013; Jin et al., 2008;); improved profitability (Dora et al., 2013; Fotopoulos et al.,
166 2011); an improved company image or reputation (Fotopoulos et al., 2011; Jin et al.,
167 2008; Katri & Collins, 2007; Massoud et al., 2010; Macheke et al., 2013); greater
168 consumer confidence (Bas et al., 2007; Trienekens & Zuurbier, 2008); and not
169 unsurprisingly, the need to comply with legislation (Bas et al., 2007; Taylor, 2001; Yap
170 & Fairman, 2006).

171

172 Taylor (2001) discussed the slow uptake of HACCP based FSMS systems by small and
173 medium-sized enterprises under seven key headings: resistance to change; lack of
174 expertise; time and money; documentation; validation and verification; and supplier
175 selection. From multiple case studies in the UK, Yap and Fairman (2006) identified
176 eight factors that impacted upon the adoption of FSMS: the lack of knowledge; the lack
177 of trust; the lack of time and money; a lack of awareness; a lack of formal management
178 systems; motivation; and external factors. Dora et al. (2013) concluded that small to
179 medium sized food manufacturers struggled to establish FSMS primarily because of the
180 lack of resources, expertise and inadequate training.

181

182 From an initial list of 18 constraints, through the use of pareto analysis, Fotopoulos,
183 Kafetzopoulos and Gotzamani (2011) concluded that 11 key constraints (limited
184 knowledge and skills; a lack of commitment to food safety by employees; resistance to
185 change and a negative attitude; a shortage of capital; lack of employee training; the
186 amount of time required; a lack of technical expertise and support; non availability of
187 human resources; the excessive amount of paper work and documentation; inappropriate
188 organisational structure and the lack of pre-requisite programs) were the most
189 influential in facilitating the implementation of a HACCP based FSMS.

190

191 Karipidis et al. (2009) grouped the barriers to the adoption of third party certified
192 quality assurance systems under two broad headings: external and internal, noting that
193 both company and product characteristics, and market conditions could also influence
194 adoption. With the use of principal component analysis, Fotopoulos, Kafetzopoulos and
195 Psomas (2009) found four latent constructs that influenced the adoption of HACCP
196 based FSMS: (i) human resource attributes; (ii) system attributes; (iii) external factors;
197 and (iv) company attributes. In Canada, Herath and Henson (2010) were able to extract
198 four factors which they labelled as: (i) the questionable appropriateness; (ii) the scale of
199 change required to achieve implementation; (iii) the low priority given to enhance food
200 safety controls; and (iv) financial constraints. In Spain, Escanciano and Santos-Vijande
201 (2014) identified three principal components: (i) the lack of knowledge; (ii) no
202 perceived need; and (iii) economic reasons as the major factors influencing the adoption
203 of FSMS.

204

205 In facilitating the adoption of third party certified FSMS, much of the literature has
206 focused on minimising the perceived barriers to adoption. Firms that have yet to embark
207 upon their journey cite enumerable internal and external barriers, including financial
208 constraints, the appropriateness of quality assurance systems to meet the needs of
209 downstream customers (Herath & Henson, 2010), the lack of knowledge (Escanciano &
210 Santos-Vijande, 2014) and the lack of any external support (Fotopoulos et al., 2009). As
211 the firm progresses on its journey towards quality assurance, many of the perceived
212 barriers and constraints diminish in importance while others such as employee and
213 cultural resistance, management and organisational issues increase in importance. As
214 Fotopoulos et al. (2011) conclude, problems associated with employees (limited
215 knowledge and skills; a lack of commitment to food safety; resistance to change; and a
216 lack of training) may be responsible for almost one half of the difficulties associated
217 with the implementation of a HACCP based FSMS.

218

219 As the firm progresses in its journey towards quality assurance, the many benefits
220 derived from operating under a third party certified FSMS become more apparent.
221 External motives for implementing quality assurance, such as the need to comply with
222 legislation or customer demands, are progressively replaced by internal motives such as
223 improving quality and efficiency, company image and due diligence (Escanciano &
224 Santos-Vijande, 2014). Thiagaragan et al. (2001) noted how the success associated with
225 the implementation of a quality assurance program was ultimately dependent upon a
226 clear belief of the benefits derived from operating under a quality assurance system and
227 the recognition that the traditional ways of doing business were no longer an option. Bas
228 et al. (2007) concluded that the successful implementation of a FSMS required a full
229 understanding of the principles associated with and a commitment to operate under a
230 quality assurance system by all levels of the organisation. Trienekens and Zuurbier
231 (2008) believe that the successful implementation of a FSMS is dependent upon
232 organizational factors such as the size of the enterprise, the type of suppliers and
233 customers, the degree of automation, product type, quality assurance requirements and
234 the degree of commitment from senior management.

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239 **Methods and materials**

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241 The data for this study was collected from the Pudong district in Shanghai, China. Once
242 a rural area, Pudong is now a thriving business metropole with many food processing
243 and manufacturing enterprises supplying domestic and export markets. To identify
244 potential respondents and to facilitate data collection, assistance was sought from the
245 Shanghai Quality Supervision Bureau, the Shanghai Fengxian Quality Supervision
246 Bureau and the Shanghai Bright Food Group. As a result, 250 questionnaires were
247 randomly distributed to food processing and manufacturing enterprises for the attention
248 of the quality control manager.

249

250 Prior to the distribution of the survey instrument, the lead author conducted several
251 face-to-face meetings with the general manager or deputy general manager of selected
252 food processing enterprises to discuss issues associated with the adoption of third party
253 certified FSMS. Two enterprises were subsequently selected to pilot test the
254 questionnaire. Where necessary, questions were adjusted according to the feedback.
255 Another two companies were then selected to test the revised survey instrument before
256 data collection commenced in September 2013.

257

258 The questionnaire was divided into three sections. Section 1 sought general information
259 about the firm: the nature of their business; the number of employees; turnover;
260 markets; the nature of ownership and the number of years the firm had been in business.
261 Section 2 was divided into four parts, but respondents only had to answer that part
262 which corresponded with the level of food safety management in their enterprise: (i) no
263 third party certified FSMS; (ii) in the process of adoption; (iii) a fully operational third
264 party certified FSMS; and (iv) the firm had abandoned its third party certified FSMS.

265

266 From the literature, 31 items were identified as constituting a major barrier to the
267 adoption of a third party certified FSMS and 25 items were identified as the key benefits
268 derived from having implemented a third party certified FSMS. Respondents were
269 asked to indicate the extent to which they agreed with each statement on a scale of 1 to
270 6, where 1 was “I agree a lot” and 6 was “I disagree a lot”. The decision to use a six
271 point scale was based on strong empirical evidence (Bishop, 1987; Coelho & Esteves,
272 2007; Mitchell, 1999; Si & Cullen, 1998) which overcomes the tendency for
273 respondents in Asia to choose the neutral mid-point. Section 3 asked a number of
274 personal questions relating to their gender, experience and position of the respondent
275 within the firm.

276

277 Using one way ANOVA, the means by stage of adoption were compared. Any
278 significant difference between the means was ascertained using Tukey’s HSD at the
279 95% confidence level.

280

281 However, as it is extremely unlikely that respondents would use all 56 items in
282 considering the potential benefits derived from and the barriers experienced in
283 implementing a third party certified FSMS, to reduce the number of items and thereby
284 identify any underlying constructs, principal component analysis was employed using
285 varimax rotation and Kaiser normalisation. Items with factor loadings below 0.4 and
286 those which cross-loaded across two or more factors were excluded (Nunnally, 1995).

287 The resultant factors were then summated (Hair et al., 1998) and the reliability of the
288 resultant factors tested using Cronbach's alpha. The resultant factor means were then
289 compared by the stage of adoption using ANOVA and Tukey's HSD.

290

291 **Results**

292

293 *Survey respondents*

294

295 Of the 250 firms contacted, a total of 219 questionnaires were returned to yield a
296 response rate of 94.8%. However, after reviewing the completed questionnaires, 204
297 were ultimately selected for analysis. For the firms that responded, 35% were currently
298 operating under a third party certified FSMS, 47% were in the process of adoption and
299 18% had yet to implement a third party certified FSMS. For those firms that were either
300 in the process of adoption or were already operating under a third party certified FSMS,
301 the most common systems were HACCP, ISO 22000, ISO 9001 and QS. Given the
302 study objectives, no attempt was made to differentiate between the alternative FSMS.

303

304 Respondents came from a diversity of different food processing sectors including
305 confectionary (20%), meat (12%), snack foods (10%), soft drinks (8%), fresh fruit and
306 vegetables (6%), oils (6%), dairy (5%), seafood (5%) and baking (4%). Given that the
307 most recent breakdowns in food safety have been recorded in the dairy and eatable oil
308 industries, all the firms operating in this sector were either in the process or were
309 already operating under a third party certified FSMS. While 90% of the firms involved
310 in seafood processing, 83% of the firms involved in fruit and vegetable processing, and
311 71% of the firms involved in meat processing were either in the process of introducing
312 or already operating under a third party certified FSMS, 28% of the firms engaged in
313 snack food production and 27% of the firms engaged in the manufacture of
314 confectionary had yet to implement a third party certified FSMS of any kind.

315

316 Of the firms participating in the study, 62% were under foreign ownership, with a
317 further 31% operating as subsidiary companies or owned and operated by multinational
318 food companies. It was with some surprise to find that 31 foreign companies (16%), 5
319 subsidiary companies (3%) and 1 multinational company had failed to introduce any
320 third party certified FSMS.

321

322 Not surprisingly, for firms that had been operating for less than three years, 28% had yet
323 to introduce a third party certified FSMS, but for firms that had been operating for more
324 than five years, the rate of adoption exceeded 91%. Similarly, where the firm employed
325 less than 50 people, the likelihood of having adopted a third party certified FSMS was
326 just 76% but as the number of employees increased, so also did the likelihood that the
327 firm would already be operating under a third party certified FSMS or in the process of
328 implementation (88%).

329

330 *Barriers to the adoption of third party certified food safety management systems*

331

332 For those firms which had yet to implement a third party certified FSMS of any kind,
333 the major barriers related to the short-term decision-making that was evident within the
334 firm, the knowledge that quality assurance was not a statutory requirement and a

335 perception that there were few if any benefits to be derived from the introduction of a
336 third party certified FSMS as the product already met customers' requirements. Those
337 firms which had yet to embark on the quality journey acknowledged that the lack of
338 records, conflicting information and the lack of any tangible government support
339 presented additional impediments (Table 1).

340

341 With a limited knowledge of the processes and procedures associated with the
342 introduction of a third party certified FSMS, respondents seemed largely unaware of the
343 high costs associated with implementation and of the considerable amount of paperwork
344 that was required to document their operating system. Having not yet commenced their
345 journey towards implementing a third party certified FSMS, respondents had yet to
346 appreciate the need to spread the costs across all of their enterprise and thus to
347 experience the limitations that a small business presents.

348

349 For those firms that were in the process of implementing a FSMS, it was evident that a
350 number of doubts were influencing decision-makers: there was an element of
351 uncertainty as to which FSMS to introduce, more so as most customers had not
352 indicated the need to have a third party certified FSMS. It was also evident in the highly
353 competitive food industry that there were other more immediate problems that needed to
354 be resolved.

355

356 To our surprise, in asking those firms that were already operating under a third party
357 certified FSMS, an enormous number of both internal and external barriers emerged.
358 Externally, while it was recognised that there was currently no need to operate under a
359 third party certified FSMS, there was a great deal of uncertainty about where the
360 legislation might go and about the potential value that a FSMS delivered to the
361 organisation. With most customers not requiring the firm to have a third party certified
362 FSMS and a strong belief that the system they were operating under prior to the
363 introduction of a formal FSMS had served them well, the benefits derived from the
364 implementation of a third party certified FSMS were being questioned. Furthermore, the
365 high costs associated with verification and certification was being debated in terms of
366 what, if any, additional value had been delivered by operating under a third party
367 certified FSMS.

368

369 Internally, the lack of records and the need to establish appropriate documentation was a
370 significant impediment. This was accentuated by budgetary constraints and the desire
371 by management to focus on other short-term priorities. It was also evident that in
372 implementing a third party certified FSMS, the small size of the business presented a
373 significant impediment. Furthermore, poor communication between departments had
374 impeded the process.

375

376 With such a large number of internal and external variables potentially influencing the
377 adoption of a third party certified FSMS, exploratory factor analysis was undertaken to
378 identify any latent underlying variables. Using principal component analysis with
379 varimax rotation and Kaiser normalisation, three constructs emerged which collectively
380 explained 70% of the variance (Table 2). With a Kaiser-Meyer-Olkin (KMO) measure
381 of sampling adequacy of 0.875, a Bartlett's test result of 1399.11 and a significance
382 level of $p < 0.000$, the data could reliably be tested using exploratory factor analysis.

383

384 Constraint 1, which was labelled as financial impediments, captured six items which
385 collectively explained almost 30% of the total variance. With a Cronbach's alpha of
386 0.873, the construct was very reliable, but with a factor mean of 3.57, was probably the
387 least influential. In deciding to implement a third party certified FSMS, significant costs
388 were incurred, initially in the implementation of the system, and subsequently in
389 seeking and maintaining certification. Most firms, because they were perceived to be
390 too small, experienced some difficulty in putting the cash aside to support the process.
391 The process was made all the more difficult by the lack of external funds and
392 consultants to assist with the introduction of a FSMS.

393

394 Borrowing from Herath and Henson (2010), Constraint 2 was labelled questionable
395 appropriateness. Within this construct it was evident that firms struggled to come to
396 grips with the additional paperwork and the bureaucracy associated with operating
397 under a third party certified FSMS, knowing full well that the system under which they
398 were currently operating was performing quite adequately. In comparing existing
399 systems with a third party certified FSMS, it was evident that the systems had much in
400 common. This made it all the more difficult to see where and how a third party certified
401 FSMS might deliver any superior value to justify the cost. The other item that the
402 construct captured was the lack of any promotion of the benefits derived from the
403 adoption of a third party certified FSMS, presumably by the government, which left
404 firms questioning why they should introduce a third party certified FSMS. With a
405 Cronbach's alpha of 0.868, this construct was also considered very reliable.

406

407 The final constraint was labelled business today. This construct was comprised of just
408 two items which reflected, in a highly competitive food industry, the need to focus on
409 other business priorities. With the rapid expansion of the food processing industry in
410 China, few firms were either willing or able to focus on long-term strategic goals. With
411 a mean of 2.81, this was the most significant barrier impacting on the firm's decision to
412 adopt a third party certified FSMS. With a Cronbach's alpha of 0.827 it too was
413 considered very reliable.

414

415 These findings were reinforced in the subsequent analysis that looked at the influence of
416 the principal components by the stage of adoption. Constraint 3 (business today) was
417 considered to be the most influential barrier by all firms, irrespective of the stage they
418 had reached in implementing a third party certified FSMS (Table 3). Those firms that
419 were currently operating under a third party certified FSMS were more likely to
420 question the value of introducing a third party certified FSMS than those firms that had
421 already made the decision not to adopt. Similarly, it was only after the firm had been
422 certified and was operating under a third party certified FSMS that the full costs became
423 apparent.

424

425 *Benefits arising from the adoption of a quality assurance system*

426

427 To our surprise, none of the food processing enterprises that responded to our
428 questionnaire were able to demonstrate that they had gained any meaningful benefit
429 from the implementation of a third party certified FSMS. Indeed, the highest levels of
430 agreement were often given by those firms that had yet to embark upon the process of

431 implementation, suggesting that there was a significant difference between perceptions
432 and reality (Table 4).

433

434 In particular, those firms which were currently operating under a third party certified
435 FSMS were very disillusioned with the experience. Few if any gains had been made in
436 reducing product losses, enhancing their competitiveness in export markets,
437 streamlining paperwork or improving profit margins. Presumably, any reductions in
438 legal liability had yet to be tested, because the firm had yet to experience a food safety
439 recall. As the market was failing to differentiate between those food processors who had
440 a third party certified FSMS and those who did not, the increasing incidence of food
441 safety breakdowns in China was having a negative impact on all food businesses,
442 including some of the world's best known fast food chains.

443

444 In an effort to identify any underlying latent constructs, principal component analysis
445 was again undertaken. On this occasion, another three constructs emerged which
446 collectively explained 70% of the total variance (Table 5). With a Kaiser-Meyer-Olkin
447 (KMO) measure of sampling adequacy of 0.889, a Bartlett's test result of 1472.28 and a
448 significance level of $p < 0.000$, once again the data could reliably be tested using factor
449 analysis.

450

451 Benefit 1, which was labelled quality attitude, was driven by the improved quality of
452 management within the organisation, the desire to improve food quality and safety, and
453 an improved company image in the market. Collectively, these benefits were perceived
454 to lead to some competitive advantage. With a Cronbach's alpha of 0.887, the factor
455 was very reliable, but with a mean of 5.59, it was apparent that most food processors
456 had yet to embrace the benefits that operating under a third party certified FSMS could
457 potentially deliver to their enterprise (Table 6).

458

459 Benefit 2, which was labelled risk mitigation, reflected potential improvements in the
460 nature of the firm's long-term relationships with suppliers and buyers, the negative
461 consequences of adverse publicity arising from a food safety incident, and the reduced
462 likelihood of product losses derived from the preventative maintenance of plant and
463 equipment. Although this factor was also very reliable (Cronbach's alpha = 0.862), with
464 a mean of 4.97, the perceived and actual benefits derived from the adoption of a third
465 party certified FSMS continued to allude most firms.

466

467 Benefit 3, which was labelled financial gains, was perhaps the most surprising result,
468 for it was observed that firms operating under a third party certified FSMS perceived
469 themselves to be worse off than those who had chosen not to adopt a third party
470 certified FSMS. The perceived gains in export competitiveness and gaining new
471 customers were not leading to any improved levels of profitability, nor were firms able
472 to assess whether the introduction of a third party certified FSMS had led to any marked
473 reduction in the likelihood of instituting a product recall.

474

475 **Discussion**

476

477 This study has found that as food processors in Shanghai progress on their journey
478 towards quality assurance, the perceived barriers and constraints escalate rather than

479 diminish. Furthermore, in what is perhaps the world's most dynamic and highly
480 competitive food market, there is a perception by those firms that have adopted a third
481 party certified FSMS that they may be less competitive in the market. For those firms
482 that have adopted a third party certified FSMS, few report any improvement in quality,
483 in profitability, in the quality of management, company image, improved relationships
484 with customers and suppliers, or in their capacity to attract new customers or to
485 penetrate new markets. The most significant constraint appears to be the absence of any
486 prescribed need for a FSMS from downstream customers.

487

488 Despite the rapid growth in modern retail formats in China, as the majority of food
489 manufacturers are small enterprises, few have the capacity to supply modern retailers or
490 export markets on a regular basis. By necessity, these firms must compete in the
491 traditional market where the primary purchasing criteria is price. As the introduction of
492 a third party certified FSMS will incur significant costs, initially in establishing
493 appropriate processes and systems, and subsequently in meeting the on-going costs of
494 auditing and verification, firms that have adopted a third party certified FSMS may
495 indeed be less competitive.

496

497 Furthermore, in this market segment, most managers are more concerned about the very
498 survival of their business rather than the introduction of improved systems that might
499 improve their long-term competitiveness. The focus on short-term goals and the failure
500 to prioritise efforts to establish a third party certified FSMS may also indicate the
501 absence of a quality culture. Fatimah, Strohbehn and Arendt (2014) propose that a firms
502 food safety culture can be evaluated by exploring employees' perceptions towards the
503 management system, style and process, leadership, communication, the sharing of
504 knowledge and information, accountability, risk perception, and the work environment.

505

506 As the legislation itself is relatively new, as firms have sought to comply, the lack of
507 any external funds to facilitate the process and the absence of a sufficient number of
508 trained quality consultants has left many firms confused, leading to a perception that a
509 great deal of effort has been expended for very little benefit. Thiagaragan et al. (2001)
510 suggested that for firms contemplating the introduction of a quality management
511 system, the plethora of precepts, principles, models and prescriptions often left the
512 business so confused that it resulted in total quality paralysis.

513

514 While the results of this study may appear to contradict those of Bai et al. (2007) who
515 reported a number of market based incentives for the food enterprises that participated
516 in their study, all 27 firms were large to medium enterprises which were producing for
517 the export market. As Bai et al. concluded "small-sized food enterprises in China has
518 little incentives to implement HACCP systems..." (p 110). Based on a study of 117
519 food companies in Zhejiang Province, Jin et al. (2008) came to a similar conclusion,
520 finding that the majority of firms which have yet to adopt a HACCP based FSMS were
521 small to medium sized enterprises where managers had a low level of education and a
522 limited understanding of the HACCP system.

523

524 Given the considerable number of both internal and external variables that have been
525 found to influence the adoption and implementation of third party certified FSMS,
526 Fotopoulos et al. (2009), Herath and Henson (2010) and Escanciano and Santos-Vijande

527 (2014) have each employed exploratory factor analysis in the hope of simplifying the
528 process through the discovery of underlying latent constructs. While drawing any
529 meaningful comparison with the results obtained from this study is problematic, due to
530 the use of different item measures and the different regulatory environments within
531 which each of these studies have been conducted, a number of similarities do
532 nevertheless emerge. Herath and Henson (2010) identified four factors, three of which
533 were captured in the present study, albeit that the constructs are somewhat different in
534 their structure (Table 7). While it is more difficult to extract any similarities from the
535 work of Fotopoulos et al. (2009) and Escanciano and Santos-Vijande (2014), difficulties
536 associated with sourcing sufficient funds, either internally or externally to support the
537 implementation of a third party certified FSMS, were common to all four studies.

538

539 In comparing the benefits derived from operating under a third party certified FSMS,
540 two of the three constructs extracted (quality attitude and financial gain), share some
541 elements in common with the findings of Escanciano and Santos-Vijande (2014)(Table
542 8). As neither Fotopoulos et al. (2009) or Herath and Henson (2010) sought to explore
543 the benefits of operating under a third party certified FSMS, it is not possible to make
544 any comparison.

545

546 **Conclusions**

547

548 For those small to medium-sized food processing enterprises that primarily supply the
549 domestic market in Shanghai, with little demand from downstream customers to operate
550 under a third party certified FSMS, the adoption and implementation of a third party
551 certified FSMS is perceived to add costs and to potentially reduce the competitiveness
552 of the firm in what it is a very price sensitive market. However, as the market matures
553 and as customers increasingly look towards the non-price attributes of the food that they
554 consume, the benefits of operating under a third party certified FSMS are expected to
555 become more evident.

556

557 As argued by Bai et al. (2007), domestic consumers should be entitled to the same food
558 safety standards as foreign consumers. As the prevention of food safety incidents is in
559 the public interest, there is a clear role for government. However, rather than to require
560 food processors to implement a FSMS through legislation, as most firms do not
561 appreciate the benefits derived by operating under such a system, there is a prior need to
562 develop a quality culture through the provision of food safety management workshops.
563 As Fernando et al. (2014) conclude, in encouraging small food processing enterprises to
564 adopt FSMS, education and promotion is more effective than legal enforcement. Jin et
565 al. (2008) come to a similar conclusion, suggesting that it is inappropriate to force small
566 enterprises to implement FSMS as most lack financial resources and infrastructure, few
567 have any real commitment to food safety management and most have not implemented
568 the pre-requisite quality management systems.

569

570 With a limited knowledge of food quality concepts, some consideration should be given
571 towards employing a greater number of trained quality management facilitators to assist
572 firms through the process. Furthermore, as most firms, irrespective of the stage of
573 adoption, experience some financial constraints in the adoption and implementation of a

574 FSMS, government may need to find a way of providing some financial assistance,
575 either directly or indirectly.

576

577 Theoretically, what this study has revealed is the need to develop a consistent set of
578 item measures that can be utilised in future studies to explore differences in the barriers
579 and the benefits derived from the implementation of third party certified FSMS. The
580 methodology proposed by Churchill (1979) provides a useful approach for generating
581 potential item measures and assessing both their reliability and validity.

582

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584

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